

PUBL C LIERARY

APR 3 - 1958

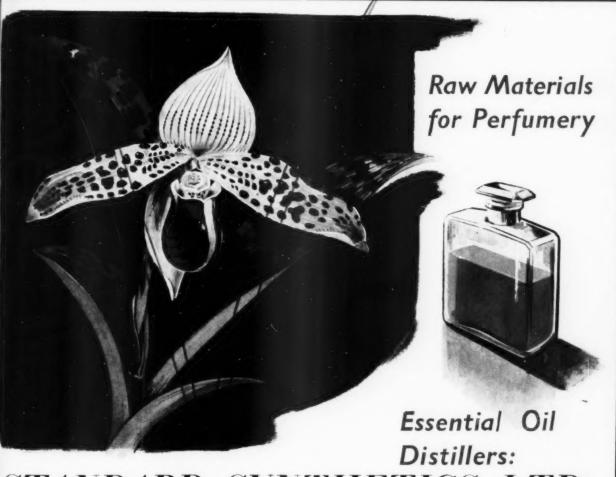
UETRUITSM

CHNOLOGY DEPT

Chemist



Pharmaceutical and Fine Chemical Trade Journal • A Monthly Journal devoted to METARY MEDICINES & FOODS · COSMETICS · SOAPS · ESSENTIAL OILS · TOILET PREPARATIONS · DENTIFRICES · ECTANTS · INSECTICIDES · DETERGENTS · POLISHES · VETERINARY PRODUCTS & OTHER CHEMICAL PRODUCTS XXIX No. 3 A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP MARCH, 1958



STANDARD SYNTHETICS LTD.

76 GLENTHAM ROAD BARNES LONDON S.W.13

METAL BOX OBLONG CANS



Minimum space wastage!



USE
OBLONG CANS
—they pack tight!

Pack in oblong cans to make the most efficient use of outers. Economise on freight charges by transporting cans—not waste space between them!

The Metal Box oblong can is excellently proportioned and designed for stability both on the filling line and on display. The external decoration is unbroken by side seams, for they are internally soldered, except in the half gallon size. These high quality Metal Box cans are available at low cost due to mass production on fully mechanised lines.

In the Metal Box range there is a size for every requirement—and one design can be reproduced on all. Sizes available: 4 fluid ozs., 5 ozs., 8 ozs., 10 ozs., 16 ozs., 20 ozs., 32 ozs., 40 ozs., ½ Imperial gallon, 1 American gallon, 1 Imperial gallon.



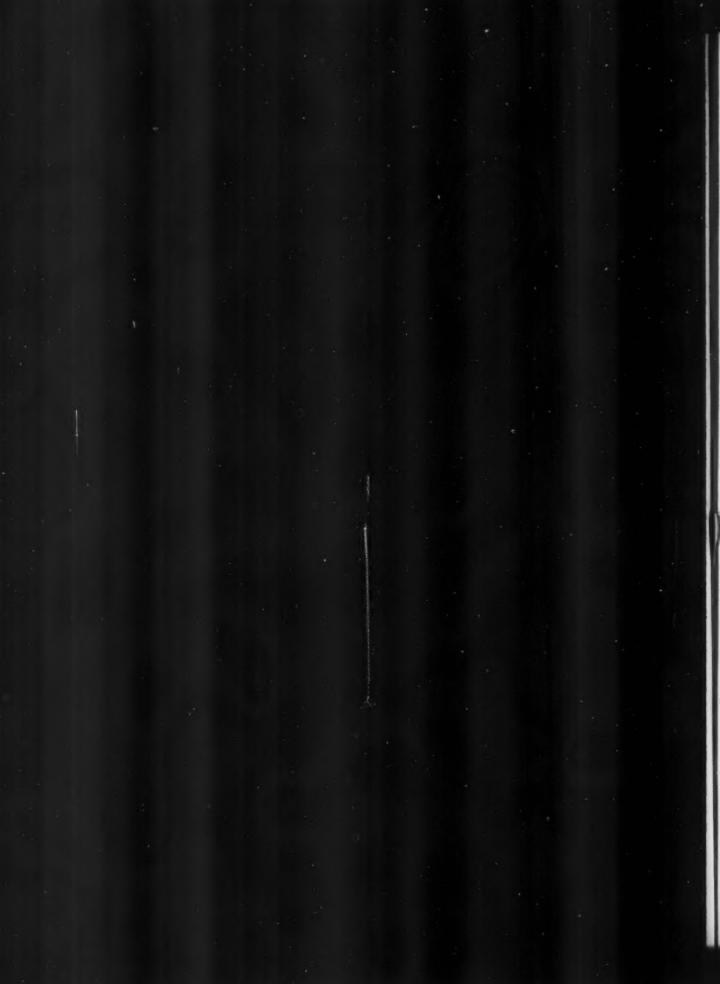
THE METAL BOX COMPANY LIMITED

Processed Food Cans · Metal Containers · Paper Products · Plastic Packages

37 BAKER STREET . LONDON W1 . HUNTER 5577

MB 21/04

mist



TEGO -

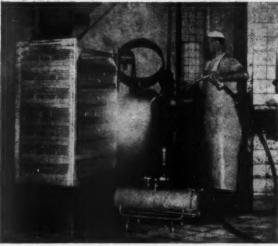
the New Technique in

PRACTICAL DISINFECTION

TEGO DISINFECTION and STERILISATION comprises an essentially practical technique of application of a new group of ampholytic surfaceactive compounds* with outstanding and distinctive properties.

Used as recommended, the compounds are active (total kill) against all micro-organisms—bacteria (including *Mycobact. tuberculosis*) fungi, spores and yeasts. Of particular importance under practical conditions of use they are:

- able to penetrate the natural barriers—grease and soil—invariably encountered under practical conditions of disinfection.
- active in the presence of protein matter, blood, pus, serum, grease and dirt.
- persistent in bactericidal activity by virtue of antibacterial film-formation on surfaces.
- highly surface-active in unusually low concentrations and possess 'dirt-carrying' capacity.
- • non-toxic and non-sensitising.
- • deodorant and odourless.
- • non-corrosive and harmless to materials.



TEGO Disinfection Technique in operation in a Food Manufacturing Establishment.

 non-productive of resistant strains of bacteria bactericidal—not merely bacteriostatic; fungicidal—not merely fungistatic.

Over the past decade TEGO DISINFECTION has been widely and increasingly used in Germany and European Countries with remarkable success in the following fields:

SURGERY AND MEDICINE · HOSPITALS · CLINICS · SANATORIA BIOLOGICAL LABORATORIES · VETERINARY PRACTICE INDUSTRIAL DISINFECTION AND STERILISATION · ABATTORS

BAKERIES · BREWERIES · CANTEENS · CATERING

DAIRY AND FARM • FISHING INDUSTRY FOOD AND MEAT INDUSTRIES • MINING

SOFT DRINKS INDUSTRY • INSTITUTIONS • BARRACKS
BATHING ESTABLISHMENTS • LAVATORIES • PUBLIC BATHS
RAILWAYS • RETAIL ESTABLISHMENTS • DOMESTIC HYGIENE

Over the last three years the TEGO Technique has been comprehensively tested in Great Britain both in the laboratory and, more significantly, in practical fields of disinfection where its outstanding effectiveness has been fully substantiated.

Based on alkyl di (aminoethyl) glycine hydrochloride described in Manufacturing Chemist, Feb. 1958, and originated in the laboratories of Th. Goldschmidt A.-G., E.sen.

TEGO TECHNIQUE OF DISINFECTION AND STERILISATION

If you are interested in TEGO DISINFECTION and STERILISATION and will indicate your field of interest we shall be happy to co-operate on hearing from you.

HOUGH, HOSEASON & COMPANY LTD., ATLAS LABORATORIES, CHAPEL STREET, MANCHESTER 19
Sole Agents in Great Britain for TEGO Disinfection Technique

					Page
A.P.V. Co. Ltd., The -		-			Oct.
Acme Showcard & Sign C	o Led	1			Nov.
Albro Fillers & Engg. Co.	Ltd.		-		A54
Alfermann, Friedrich-Karl	-				Jan.
Alginate Industries Ltd.					Feb.
Alite Machines Ltd		-			A94
Allen, Stafford, & Sons Lt	d.				A25
			-		A59
Amplex Appliances (Kent	Led.				A100
Anderson, C. F., & Son Li	td.		*		Feb.
Arden, H. B., & Co. Ltd.		-		-	Feb.
Armstrong Cork Co. Ltd.					A27
Arthol Ltd			-		AI3
Ashby, Morris, Ltd	-		-		Feb.
Astra Chemicals Ltd.					Dec.
Autopack Ltd					July
Avery, W. & T., Ltd.			**	-	Oct.
B.U. Supplies & Machiner	v Co.	Ltd.			A70
Baker Platinum Ltd	,				A49
Bannister Street Works L	ed.				Nov.
Barter Trading Corporation	on		-		A22
Beatson, Clark & Co. Ltd.					A43
Beckman Instruments Ltd.					A8
		-	-		A67
Bennett Sons & Shears Ltr	4.			-	June
					A89
Betts & Co. Ltd	-		-		Feb.
Birlec Ltd		-	-		Feb.
Blachford H. L., Ltd					Jan.
Boulton, W., Ltd		-			July.
Bowser, Monks & Whiteh	ouse I	Ltd.			Jan.
					A66 °
Briggs, S., & Co. Ltd			-		A64
British Ceca Co. Ltd.					A90
British Celanese Ltd			-		Feb.
British Cellophane Ltd.	-			-	July
British Drug Houses Ltd.,	The	-			Feb.
British Industrial Solvents		-			A16
British Labour Pump Co.					Sept.
British Rayophane Ltd.	-		-		Dec.
British Railways -	-	-	-		Feb.
British Road Services Ltd.					Nov
Broadbent, Thomas, & Son	s Ltd.				Feb.
Brogli, Alfred, & Co.					Aug.
Brome & Schimmer Ltd.					A102
Bromhead & Denison Ltd.					Sept.
Burroughs Wellcome & Co	o. Ltd				A93
Bush, Beach, & Gent Ltd.					A102
Bush, W. J., & Co. Ltd.					A81
Butterfield, W. P., Ltd.					ALL

				Page
C.A.S. (Industrial Development	ts) L	td.		Dec.
Calfos Ltd		-		_A4
Cambridge Instrument Co. Ltd				Oct.
Cannon (C.P.) Ltd. Carless, Capel & Leonard Ltd. Carlson, John C. Ltd. Cassidy, Peter, Ltd. Chemapol Chemical Compounds Ltd. Chemical & Feeds Ltd. Christy & Norris Ltd. Cirema-Television Ltd. Clark, T. & C., Ltd Clark	-			AI2
Carless, Capel & Leonard Ltd.			-	A66
Carlson, John C. Ltd		-		Feb.
Cassidy, Peter, Ltd		-		Aug.
Chemapol		-		A72
Chemical Compounds Ltd.		-		A98
Chemicals & Feeds Ltd				A104
Christy & Norris Ltd	-			June
Christy & Norris Ltd Cinema-Television Ltd Clark, T. & C., Ltd Clarke-Built Ltd Classified Advertisements - Cleveland Meters Ltd	40.			Dec.
Clark, T. & C., Ltd				A97
Clarke-Built Ltd.		-		A69
Classified Advertisements	-		A105,	
Claveland Meters Ltd	_			Feb.
Coalite & Chemical Products L	he	-		A65
Cocker Chemical Co. Ltd	-	-	-	A68
Couper, Friend & Co. Ltd.				A102
Cour P R & Co Ltd.				Nov.
Cow, P. B., a Co. Ltd.				A70
Cox, Arthur H., & Co. Ltd.				
Croda Ltd.			-	A82
Cumming, J. VV., & Son Ltd.	*			Feb.
Cow, P. B., & Co. Ltd Cox, Arthur H., & Co. Ltd. Croda Ltd Cumming, J. W., & Son Ltd. Cyclo Chemicals Ltd		*	-	June
Dalmas Ltd				Feb.
Dawson Bros. Ltd				A76
Deckelmann losef				A104
Dehydag -	-			Dec.
Delf W M (Liverneel) Ltd				Feb.
Daussche Hydriagwerke CmhH		-		Nov.
Device Bubber & Ebesies Led		-		Sept.
Dexine Rubber & Ebonite Ltd.	-	-		A36
Dore, John, & Co. Ltd			*	
Dragoco	-		-	A4I
Durham Raw Materials Ltd.	-	*		Dec.
Dalmas Ltd			*	A38
				July
Enamelled Metal Products Corp	orați	ion		Dec.
Engineering Dev. (England) Ltd.				Jan.
English Clave Lovering Pachin	R Co	Led		Feb.
Evans Chemicals Ltd	-			A60
Evans Medical Supplies Ltd.				Dec.
Evans Morena & Rais Led	-	-		A62
Evans Chemicals Ltd. Evans Medical Supplies Ltd. Evans, Norman, & Rais Ltd. Excorna	-		-	A102
excorna				AIUZ
Farrow & Jackson Ltd Fatoils Ltd Ferranti Ltd Fifer, A., Ltd Firth-Vickers Stainless Steels Ltd. Flexile Metal Co. Ltd.	-	-		A92
Fatoils Ltd	-			A104
Ferranti Ltd	-	-	A68,	A73
Fifer, A., Ltd	*		-	A74
Firth-Vickers Stainless Steels Ltd	d.	-	-	A21
Flexile Metal Co. Ltd		:		7-000
Fluid Equipment Co. Ltd		-		Feb.
Flexile Metal Co. Ltd Fluid Equipment Co. Ltd Foamite Ltd	-			Jan.
Follsain-Wycliffe Foundries Ltd.		*	:	A90

					Po
Ford, T. B., Ltd					Fe
Foster, Yates & Thom Lt	d.		-	-	Fe
Fraser & Fraser Ltd			-	-	Au
Fraser, W. J., & Co. Ltd.					Fe
Freeman, Wm., & Co. Li	td		-	-	Fe
Fritsch, Rudolf W	-			-	A
Ford, T. B., Ltd Foster, Yates & Thom Lt Fraser & Fraser Ltd Fraser, W. J., & Co. Ltd. Freeman, Wm., & Co. Lt Fritsch, Rudolf W Funditor, Ltd			-		No
Gale, Ronald, & Co. Ltd. Gallenkamp, A., & Co. L.	ed	-			De
					All
Gardner, Wm., & Sons L Gibbs, Antony, & Sons L Gibbert, G. R., Ltd. Giusti, T., & Son Ltd. Givardan, L., & Co. Ltd. Glass Containers (Medica Glass Containers (Medica Glasva Laboratories Ltd. Glavers (Chemicals) Ltd. Goetz, Hermann Gosheron, John, & Co. L Goya Ltd. Graesser Salicylares Ltd.	Ciouc	.45641	, bea.	-	All
Cilbert C B Led	ta.		-	_	O
Gilbert, G. K., Etc			-		A
Giusti, I., & Son Ltd.	-		*		Fe
Givaudan, L., & Co. Ltd.				-	0
Glass Containers (Medici	BI) Lte	3. "	-		A
Glastics Ltd			-		
Glaxo Laboratories Ltd.	-	-		-	Fe
Glenham Products Ltd.		-			M
Glovers (Chemicals) Ltd.			-		A
Goetz, Hermann -		-	-		M
Gosheron, John, & Co. L	td.	-		•	Fe
Goya Ltd					Au
Graesser Salicylates Ltd.					A!
Graesser-Thomas, H. W.,	Ltd.				AS
Griffin & George Ltd.		-			Fe
Goya Ltd. Graesser Salicylates Ltd. Graesser-Thomas, H. W., Griffin & George Ltd. Gurr, Edward, Ltd.	-		-	*	Fe
Haigh, John, & Co. Ltd. Hail, J. Edward, Ltd Hail & Lane Ltd Hanna, Victor E., Ltd. Hanover Fair - Harrison Carter, J., Ltd. Harvey, G. A., & Co. (Lo Hathernware Ltd	-			-	De
Half I Edward Ltd	-		-	-	Ju
Hall & Lane Ltd	_	-	-		Fe
Manna Victor E Led	-	_	-		AIG
Hannyan Fair	-	-	3		A!
Hansison Conten 1 1ed	-		-		Fe
Harrison Carter, J., Ltd.	-4	Lad	-		A
Harvey, G. A., & Co. (Lo	ngon	, Lta.	-		A
Mathernware Ltd	-		-		AE
Marvey, G. A., & Co. (L. Hathernware Ltd Haworrth (A. R. C.) F., Ltd. Heinz, Carl Aug Herbst, F., & Co Heston Equipment Co. Li Hilger & Watts Ltd Hobart Mg. Co. Ltd. Hoechst Chemicals Ltd Honeywill & Stein Ltd Honeywill & Honeywill & Stein Ltd Honeyw		-			AIC
Heinz, Carl Aug		-	-	-	AIG
Herbst, F., & Co.		-			
Heston Equipment Co. Li	td.				Ja
Hilger & Watts Ltd		-			AE
Hobart Mfg. Co. Ltd.		-	-	-	No
Hoechst Chemicals Ltd.				**	A7
Honeywill Atlas Ltd			-		A9
Honeywill & Stein Ltd.	-			.00.	A9
Horner, L. A., & Sons Ltd	i.				A9
Honeywill & Stein Ltd. Horner, L. A., & Sons Ltd Hough, Hoseason & Co. I	td.	-			A
Hunting-Clan Air Transpo	ort Lt	d.			Sep
11-16-1-1-1				-	A8
		-	-		A2
Ideal Capsules Ltd					
Impact Extrusions Ltd.	e la la		0 42	0 42	
Ideal Capsules Ltd. Impact Extrusions Ltd. Imperial Chemical Industr	ies L	d. A	19, A2	0, A2	9, A3
Industrial Tapes Ltd	100		-	-	Uc
Impact Extrusions Ltd Impact Extrusions Ltd Imperial Chemical Industr Industrial Tapes Ltd International Bottle Co. L Inverni & Della Beffa S.p.	.td.	-		0, A2	Oc A7 Ma

Edible Bone Phosphate

Full particulars, samples and prices from Calfos Ltd.

Imperial House, Kingsway, London, W. C. 2 Telephone: Temple Bar 3629

HYGIENE puts YOU on OUR metal!

STACKING TRAYS



emist

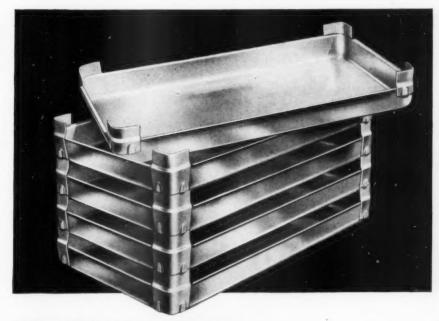












STACKING TRAY (Catalogue No. TB.27153)

As illustrated above, having dimensions of $26\frac{3}{4}'' \times 14\frac{3}{4}'' \times 2\frac{1}{4}''$ made as pressings from 16g Light Alloy with special corner stacking features which have convex locating dimples for greater efficiency and giving 3" air space when stacked. Alternative brackets giving greater or less air space can be fitted if required.

> Also available with a depth of 13" (TB.27151) and both depths can have perforated bases.

> A very wide range of pressed trays with cut top edges, 4 rolled edges, or flanged edges can also be offered, write to . . .

WARWICK PRODUCTION COMPANY LTD

A MEMBER OF THE ALMIN GROUP

BIRMINGHAM ROAD, WARWICK. Telephone: WARWICK 693-696

							Bann
Innered Lad							Page
Isopad Ltd.					-		Feb.
Ivers-Lee Ltd.						-	Feb.
Jackson, J. G.,	& Cro	ockatt	Ltd.				Jan.
Jacobson Van	Den Be	erg &	Co. (U.K.)	Ltd.		A96
Johns-Manville							Sept.
Johns, Son &	Watts	Ltd.				-	A58
Johnsen & Jor	gensen	Led.				-	A40
Johnson, S. H.	. & Co	Ltd.			-		A56
Johnston "Lig	hening	" Fille	er Co.				Nov.
Jones, Samuel,	& Co.	Ltd.					A54
Kaylene (Cher	nicala)	Led	_	_	_	_	AIOI
Kek Ltd				-	-		Feb.
Kellys, John (1					-		Feb.
Kemball, Bisho				-	-		Feb.
Kemwall Engir							Jan.
Kendall, F., &			-				A104
Kestner Evapo			- C-				A103
Kiessling, Qua					•	~/0,	A104
Kimpton Bros.	Lad	inixe i	rien				
Kolmar Cosme	Lto.	-	d) I ad				Nov.
Kork-N-Seal L			a) Fra		•		
K. W. Chemic			-				Feb.
				-		•	
Lacrinoid Prod							Sept.
Lankro Chemi						-	A7
Laporte Chem		td.					Dec.
Lattimer, H.							A104
							A44
Lavino (Londo						AI4	, A15
Lawtons of Liv		Ltd.					Feb.
Lax & Shaw Lt							A80
Lennox Found		Led.				-	A52
Lep Transport							Dec.
Leybold Vacuu	m Sale	s Ltd.					Nov.
Link, Alfred							A100
McKesson & R	obbins	Ltd.					A102
Manesty Machi							A80
Manlove Alliot							A46
Manning, A. J.							ABB
Marchon Produ	ices Le	d.			-	_	A47
Mark-O-Print					-	-	Dec.
Marston Excels					_	-	Feb.
May & Baker L						-	A24
M.C.P. Pure Di							Jan.
Metafiltration	Co. Lee	L. The					A86
Metal Box Co.				- Co			A26
Metal Hydrides							A97
Midland Emplo	vers' h	Ausua		rance	Ltd		Oct.
Midland Tar Di	stillers	Ltd.	The				Oct.
Miller, P. & L.,							Feb.
Minnesota Mini				1.			Sept.
					_		sept.

					Page
Mitchell, L. A., Ltd Mono Pumps Ltd Monsanto Chemicals Ltd. Morgan Fairest Ltd Moritz Chemical Engg. Ltd Morson, Thomas, & Son Li Mulberry Co., The		-			A99
Mono Pumps Led	-	-	-		Feb.
Monsanto Chemicals Ltd.	-				A30
Morgan Fairest Ltd			-	-	A35
Moritz Chemical Enge, Ltd	d.				A90
Morson, Thomas, & Son L	td.				Feb.
Mulberry Co., The -	-	-	-		Dec.
M-1 101 144 5-04					
National Glass Works (Yo					A34
N. V. Sluy Boechout				-	Jan.
Olley, C., & Sons Ltd.	-				Feb.
Page, Chas., & Co. Ltd. Palfrey, Wm. Ltd.		-			A104
Palfrey, Wm. Ltd					Feb.
					Sept.
Pascall Engineering Co., Lt Paterson Engineering Co.	d.				Dec.
Paterson Engineering Co.	Ltd.			-	Feb.
Paterson Engineering Co. Pearce, L. R. B., Lcd. Pearlite Box Co. Ltd. Peerlite Box Co. Ltd. Peerless & Ericson Petrochemicals Ltd. Pharmacautical Press, The Philips Electrical Ltd. Plastic Closures Ltd. Plenty & Son Ltd. Pools & Schwarz Ltd. Poth, Hille & Co. Ltd. Poth, Potter & Clarke Ltd.					A96
Pearlite Box Co. Ltd		-	-	-	Feb.
Peerless & Ericson -			-		Jan.
Petrochemicals Ltd	-			-	A85
Pharmaceutical Press, The	-	-		-	A72
Philips Electrical Ltd.	-				A83
Plastic Closures Ltd.				-	A33
Plenty & Son Ltd					A60
Polak & Schwarz Ltd.					A39
Poth, Hille & Co. Ltd.					A82
Potter & Clarke Ltd. Precast Utilites (London) I Premier Colloid Mills Ltd. Pulverizing Machinery Ltd.	-			-	Feb.
Precast Utilites (London) I	Ltd.			-	Nov.
Premier Colloid Mills Ltd.				100	Feb.
Pulverizing Machinery Ltd.				-	Feb.
Purdy Machinery Co. Ltd.		-		-	Feb.
Purdy Machinery Co. Ltd. Pyrene Co. Ltd. Pyrethrum Board of Kenya				-	Feb.
Pyrethrum Board of Kenya	-				Feb.
Q.V.F. Ltd		-		-	Feb.
Ransomes, Sims & Jefferies Reed, R. F., Ltd. Reed Corrugated Cases Ltd Rejafix Ltd. Remploy Ltd. Renham & Romley Ltd. Rexolin Chemicals	Ltd.		-	-	Oct.
Read, R. F., Ltd		-	-	-	A103
Reed Corrugated Cases Ltd	d.				A45
Rejafix Ltd	-		-		A78
Remploy Ltd					Jan.
Renham & Romley Ltd.				-	AIOO
Rexolin Chemicals -			-	-	Feb.
				- 1	A77
Richford, E. M., Ltd Roberts Patent Filling Mac					A94
Roberts Patent Filling Mac	hine (Co. Li	td.		Feb.
Robinson Brothers Ltd.	-	-	-	-	A87
Roberts Patent Filling Maci Robinson Brothers Ltd. Robinson & Sons Ltd. Roche Products Ltd Ronsheim & Moore Ltd. Roussel Laboratories Ltd.		-			A53
Roche Products Ltd		-		-	Feb.
Ronsheim & Moore Ltd.	-		-		Jan.
Roussel Laboratories Ltd.					A5I
Rubeck, H., Ltd				-	Feb.
Sanders, H. G., Sons Ltd.					Nov.
Saniguard Appliances Ltd.					Jan.
	-	-			AIB

		_	_	_		-
Scherer, R. P., Ltd. Sellotape Industrial Service Electric Co Shell Chemical Co. Siemsgluss, Frido						Page
Scherer R. P. Ltd.						Cover 4
Sellotane Industrial		-	-		-	Sept
Service Electric Co.	Ltd.	-				Feb.
Shell Chemical Co.	Ltd.	-				Feb.
Siemsgluss, Frido Silverson Machines Simpson, W. S., & G Sipon Products Ltd. Smith, T. & H., Ltd Smith & McLaurin I Southern Apparatus			-	-		
Silverson Machines	(Sales	Ltd.				A84
Simpson, W. S., &	Co. Lt	d.				A104
Sipon Products Ltd.		-		-		A100
Smith, T. & H., Ltd				-	-	A42
Smith & McLaurin I	.td.	-			-	Jan.
Southern Apparatus	Co. I	.td.	-			A62
Stainless Steel Vesse	els (Lo	ndon) Ltd.			Feb.
Standard Synthetics	Ltd.	-			. (Cover I
Star Machinery Pty.	Ltd.		-		*	Feb.
Steel, J. M., & Co. I	_td.	-	-	-		A91
Stephens Bros. & Bi	nner	Ltd.		-	-	A74
Sturge, J. & E., Ltd.		-			-	A28
Sturtevant Engineer	ing Co	o. Ltd				Feb.
Sutalite Ltd			-	-	-	A90
Sutcliffe Speakman,	& Co.	Ltd.				Feb.
Stainless Sceel Vess Standard Synthetics Star Machinery Pty. Steel, J. M., & Co. 1 Stephens Bros. & B. Sturgea, J. & E., Ltd. Sturtevant Engineer Sutalite Ltd. Sutcliffe Speakman, Taylor Rustless Fitti Tennants (Lancashir Thames Board Mills Thompson & Cappe Tickopres Div., Dap Tillotson & Sons Ltr.	nes C	0 150	4.			Feb.
Tennants (Lancashir	e) Ltd					A92
Thames Board Mills	Led					A50
Thompson & Cappe	r Ltd.	-				AIO
Tickopres Div. Dan	ag (19	43) L	rd.		-	Feb.
Tillotson & Sons Lte	1.	-, -	-			Jan.
Todd Bros. (St. Hele	ens &	Widn	es) L	td.		Nov.
Trade Agent for My	sore					A98
Trade Commissions	er for	the	Briti	sh W	/est	
Indias British Gui	202 20	d Rei	righ b	land:	IPRE	Dec.
Trapow, D., & Co. Tungstone Products	Ltd.				-	Jan.
						A63
Manager Land						Jan.
Ultrasonics Ltd.	-	-	-	-	-	ASS
Union Carbide Ltd.	Male	Led		-	-	A31
United Glass Bottle	rinns	Co	Led	-		A104
Universal Meral Pro	ducte	Led.	Ltu.	-	-	Feb.
Universal Oil Co. Is	duces	Ltu.	-	-		A95
Ultrasonics Ltd. Union Carbide Ltd. United Glass Bottle United Indigo & Ch Universal Metal Pro Universal Oil Co. Li Universal Postal Fra	nkers	Led	-	-	-	~~
Omversar rostar rra	114019	Pre.	-	_		
Venesta Ltd			-	-		Feb.
Vickerys Ltd		100	-			Dec.
Viscose Developmen	it Co.	Ltd.				Feb.
Wanuick Production	Col	led.	-	-		A5
Wass Pritchard & C	o Led	Leu.	-	-		A37
Wassermann G A			-	-		Sept.
Warwick Production Wass, Pritchard & C Wassermann, G. A. Weatherfoil Heating Weddel Pharmaceut Welch, J. A. (Plant & Westbrook Lanolin White Sea & Balsic	Syste	m Lt	d.			A48
Weddel Pharmaceus	icals					Feb.
Welch, J. A. (Plant)	k Vess	el) L	td.	-		A94
Westbrook Lanolin	Co.					Dec.
White Sea & Baltic (Co.					A94
Willcox, W. H., Co	Ltd.					AI7
White Sea & Baltic (Willcox, W. H., Co Woodhams, Dade & Woodhams, Dade &	Co.			-		A104
Wood-Wool & Fibre	Co. I	.td.				Jan.
		-				

For Orderly Storage . .

ORDERLINESS and efficiency go together. Harvey Steel Storage Equipment provides a solution to every problem of storing materials, components and finished goods in an orderly manner. Well designed, readily adjustable, strong and durable, Harvey Equipment embraces bins, racks and shelving planned to meet the special needs of every trade and industry.

Please ask for Catalogue No. MC 775





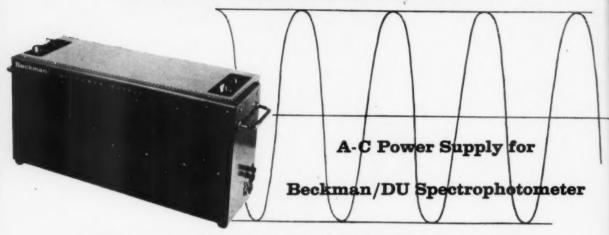
STEEL STORAGE EQUIPMENT

G. A. HARVEY & CO. (LONDON) LTD., WOOLWICH ROAD, LONDON, S.E.7. Telephone: GREenwich 3232 (22 lines)



SALT CONTENT LANKRO NEWS Arylan S.90 Flake DODECYL BENZENE SODIUM SULPHONATE Ideal liquid detergent base, ACTIVE FLAKE High active, Low electrolytes, High performance, Low cost. For details and formulations write to: LANKRO CHEMICALS LTD., ECCLES, MANCHESTER N OFFICE: 12 WHITEHALL, N.S.W.I. TEL.: TRAFALGAR 4001/2

The most important accessory ever developed for the famous DU Spectrophotometer



This new accessory greatly extends the usefulness and convenience of the DU Spectrophotometer. It is the only power supply unit on the market that provides all the voltages required for the AC operation of the popular Beckman Model DU. The AC Power Supply eliminates

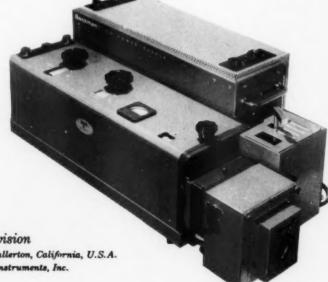
- storage battery
- all dry cell batteries
- storage battery power regulator
- · hydrogen lamp power supply

and provides regulated power for

- DU Spectrophotometer
- tungsten lamp
- hydrogen lamp
- · mercury lamp
- photomultiplier attachment

A compact unit, it is conveniently located behind the DU, operating controls within easy reach. An AC-operated DU Spectrophotometer, complete with Dual Source Unit, Photomultiplier, and matched Silica Cells, also is available.

Sales and service facilities located in 54 countries outside the United States and Canada . . . Write the International Division for the name of your Beckman dealer.



Beckman[•]

International Division 2500 Fullerton Road, Fullerton, California, U.S.A. a division of Beckman Instruments, Inc.





CHLOROFORM

PERCHLOROETHYLENE

METHYLENE CHLOR DE

TRICHLOROETHYLENE

If you have a solvent problem, one of the I.C.I. chlorinated hydrocarbons may provide the solution

Non-inflammable Chlorinated Hydrocarbons

Solvents with a wide range of application, including metal degreasing, dry cleaning, paint removal, and the extraction of oils, fats, waxes, pharmaceuticals and other fine chemicals.



Available from

IMPERIAL CHEMICAL INDUSTRIES LTD. LONDON, S.W.I

GC.10



THE SHAPES VARY . . .

Tablets have so many obvious advantages that more and more people are using them.

Tablets are so convenient—you can be certain of accuracy, uniformity, and there is no waste. Size, shape and weight vary depending on need.

Catalysts, Plastics, Desiccants, p-Dichlorobenzene blocks, Fertilisers, Pharmaceuticals, Food Products, etc. etc.

Tablets for Kjeldahl Determinations and other standardised techniques.

There are hundreds of different shapes and sizes—in thousands or millions, pounds or tons.

We will gladly advise whether a satisfactory tablet can be made—and prove it.

USES

VARY

T00

THOMPSON & CAPPER LTD.

MANUFACTURING CHEMISTS SPEKE, LIVERPOOL

Telephone: Hunts Cross 1321

Stainless Steel

Mild Steel

recipe for growth

A plant, vegetable, drinks, stores, and uses liquid In its growth, which is often directed for the benefit of Man.

A plant, mineral, (which is where we come in)

also stores and/or uses liquids

very definitely in the interests of Man.

The prime consideration here is efficiency.. the job to be done

is in no doubt, the metal required is specified, and Butterfield craftsmen flex

their muscles accordingly. And to some

purpose..if we read aright the

message of the ever-increasing volume of orders

We are equipped
with Weld X-Ray Plant,
materials testing and
microscopic examination
facilities for any
required class of work

Nickel

Aluminium

Butterfield

STORAGE AND PROCESSING PLANT

Monel

W. P. Butterfield Ltd

P.O. Box 38 Shipley Yorkshire Telephone 52244 (8 lines)

Branches

LONDON Tel HOLborn 2455 (4 lines)** BIRMINGHAM Tel EAS 0871 & 2241 BRISTOL Tel 27905

LIVERPOOL Tel Central 0829

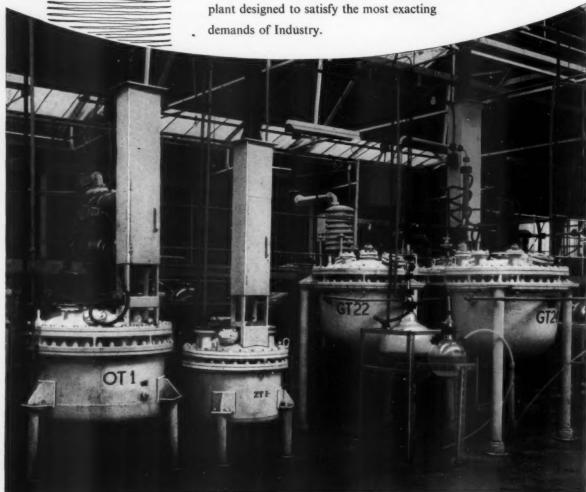
MANCHESTER Tel Blackfriars 9417 NEWCASTLE-ON-TYNE Tel 23823
GLASGOW Tel Central 7696

DUBLIN Tel 77232 BELFAST N.I. Tel 57343



ACID RESISTING, GLASS-LINED CHEMICAL PLANT

Whether you require complete plant or a single pan, specify Cannon acid-resisting glass-lined cast iron chemical plant designed to satisfy the most exacting



Another of the installations at the Sandridge Laboratories of F. W. Berk & Co. Ltd., where a wide range of Cannon glass enamel-lined vessels and ancillary equipment is in service.

CANNON (CP) LTD · DEEPFIELDS · BILSTON · STAFFS



NT

AFFS

emist

March Guide

to Buyers

BENZYL ACETATE F.A. EXTRA
(A superfine perfumery quality)

EUGENOL P

GERANIOL PALMAROSA
LINALOL EX Bois de Rose
LINALOL EXTRA EX Bois de Rose
PHENOXYETHYL ALCOHOL B.P.C.
SANTALOL
SANTALYL ACETATE

Samples and quotations on application to Dept. 'M'

ARTHOL

LIMITED

* * *

ESSENTIAL OILS

Natural, Synthetic & Terpeneless.

PERFUME ESSENCES

for DEODORISERS etc.

Perfumes

AROMATIC CHEMICALS

TELEGRAMS "SYNTHETICS"
CHESTER

SEALAND ROAD

TELEPHONE CHESTER 25664
A.B.C. CODES 5th & 6th EDS

WE CLAIM



UNIFORM
DISTRIBUTION
THOROUGH DISPERSION
& WETTING
UNVARYING QUALITY
OF OUTPUT
CONSTANT MIXING
TIMES



Let us prove it ...

Send your materials for a practical test to be carried out in confidence or write initially for comprehensive catalogue showing the outstanding features and range of machines.

Sole Distributors:

LAVINO (LONDON) LIMITED

GARRARD HOUSE, 31-45 GRESHAM ST., LONDON EC.2 Tel: MONarch 6137

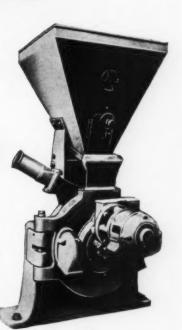
Sole Manufacturers: E. HUNT & CO. LTD., Ripple Road, Barking, Essex. Tel.: Rippleway 1444

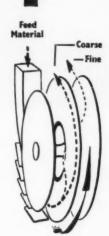
ALPINE MIKROPLEX CLASSIFIERS

AIR SEPARATE DOWN TO 3 MICRON

MIKROPLEX

This classifier has been developed on entirely new aerodynamic principles which permit accurate divided fractions of powders above and below a determined particle size with a larger yield and cleaner cut. Machines are available with larger throughputs giving cut sizes from 90 down to 3 micron. Special machines are available for sensitive or explosive materials, etc.





ALSO FINE GRINDING AND PULVERISING MILLS

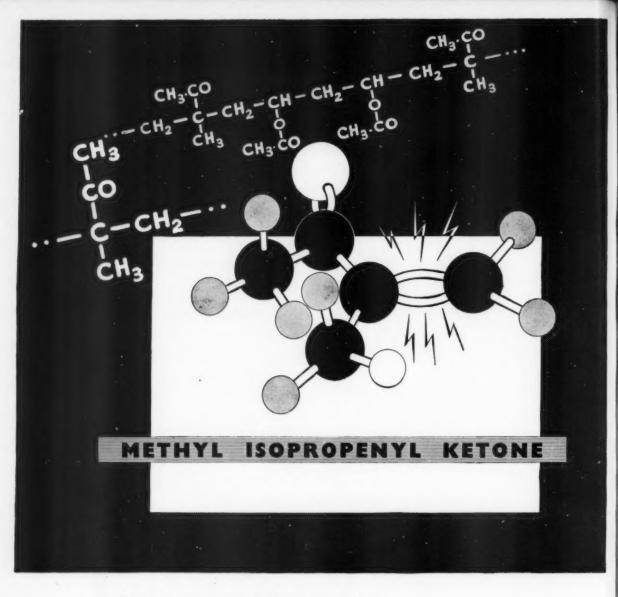
Please write for details or send materials for laboratory tests which will be carried out in confidence.

Manufactured by Alpine A.G. and distributed in the United Kingdom by

LAVINO (LONDON) LIMITED

CARRARD HOUSE . 31-45 GRESHAM ST., LONDON E.C.2 Tel: MONarch 6137

nist



An interesting intermediate: A new monomer for co-polymerisation

PILOT PLANT QUANTITIES, SAMPLES & COMMERCIAL INFORMATION ARE AVAILABLE from the Technical Sales Department

BRITISH INDUSTRIAL SOLVENTS (The Distillers Company Limited — Chemical Division)

Devonshire House, Mayfair Place, Piccadilly, London, W.I. Tel: Mayfair 8867

for ALL ENGINEERING SUPPLIES -

COCKS, VALVES
GAUGES, ETC.
HOP PACKINGS, JOINTINGS
8022 BELTINGS, VEE ROPES
25 lines OILS AND GREASES
HOSES AND FITTINGS
ETC., ETC.

LARGE STOCKS

KEEN PRICES

Write or phone

W.H.WILLCOX&CO.LTD.

SOUTHWARK STREET, LONDON, S.E.I



Ask your boxmaker or agents of the FINNISH, NORWEGIAN AND SWEDISH FOLDING BOX BOARD MILLS OR WRITE TO THE INFORMATION & RESEARCH DEPT., P.O. BOX 7232 STOCKHOLM 7



the ts—
t by ters
N—
t ped
bre.
ards
t, as
tits
eads

1

not ow?



cvs-16 hemist



METAL BOX
OFFERS



printed

POLYSTYRENE TUBES

The colour printed polystyrene tube is the latest aid to the sale of tablets. Direct printing in two colours on the surface of the tube replaces labelling entirely, and the tube presents an extra smart and attractive appearance on the sales counter. Polystyrene tubes are tough and light. Each is effectively sealed by a one-piece polythene stopper, easy to remove and easy to replace. For additional sales-appeal a wide range of coloured stoppers is available. Please ask today for samples and further details.







Pack your products in containers that will not be left on the bathroom shelf! Metal Box polystyrene tubes are attractive and specially designed to be carried in the pocket or handbag.

CUT
THE COST OF
COTTON WOOL!





The Pillar Pack Stopper with the flexible prongs holds tablets gently in place, keeping them undamaged. No cotton wool is needed, no labour to insert it. The tube looks meat,

clean and efficient. Pillar Pack Stoppers can be supplied with the 11." × 2½" tube, and are used by ICI for the Savlon pack featured in the main illustration.



THE METAL BOX COMPANY LIMITED

Plastics Group - 37 BAKER STREET - LONDON - W.1 - Hunter 5577

HB53/02

Aig



A20

March, 1958-Manufacturing Chemist

increased production means quicker deliveries



Firth-Vickers Sheet Warehouse at Shepcote Lane

More and more fabricators in stainless steels obtain their supplies in the form of sheet. Quick delivery is offered and the finish is better than ever before.

Individual sheets, 14 gauge and thinner up to 40 inches wide and 12 feet long, can of course still be supplied in the well-known grades of "Staybrite" stainless steel.

Our long-standing technical experience is always available to advise on the correct type of stainless steel to be used for your particular service conditions.





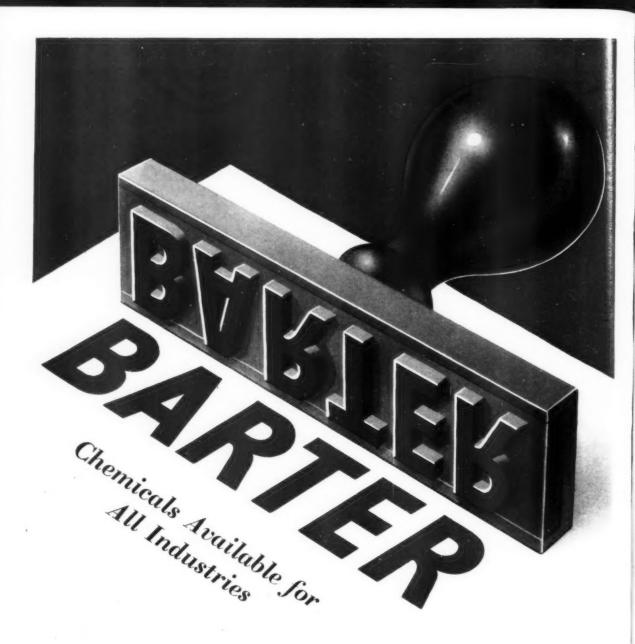
emist

W

n

ie

FIRTH-VICKERS STAINLESS STEELS LTD., SHEFFIELD



BARTER TRADING CORPORATION LTD 14 WATERLOO PLACE, LONDON, S.W.1. Telephone: WHITEHALL 1301 Telegrams: BARTRACORP, PICCY, LONDON A Member of the Tennant Group

IMPAC EXTR advis ollapsible thermone VALDERMA A Case of PERFECTION MACLEANS peroxide TOOTH PASTE

Manufacturing Chemist March, 1958

nemist

A23







DEODORANT RLOCKS . DISINFECTANTS INKS . PLASTICS . RUBBER . SPRAYS

MAY & BAKER LTD · DAGENHAM · ENGLAND
Telephone DOMInion 3060
Extension 355

The 'Planarome' series is a range of aromatic compounds specially designed for use in household and industrial products.

You will find them an extremely efficient—and economical—means of enhancing the sales appeal of your product.

We shall be glad to send test samples and further information on request. Should, however, none of our standard compounds appear suitable, please do not hesitate to let us have a detailed enquiry; this will enable us to make a specific recommendation and to forward samples for your approval.

SECCLATED HOUSES! SOMEAY - LAGOS - MONTREAL - PORT SIZABETH - SYDNEY - WELLINGTON - BRANCHES AND AGENTS THROUGHOUT THE WORLD







OINTMENTS & CREAMS in bulk

StaffordAllenS ointments and creams are exceptionally fine and smooth. Solid ingredients are added in fine subdivisions and very fine milling of the ointment mix is achieved through micrometer adjusted Colloid Mills.

Our range includes:

CREM. CALAMIN. CO., B.P.C.

CREM. ZINCI OXID., B.P.C.

UNG. ACID BENZ. CO., B.P.C.

UNG. CAPSICI, B.P.

UNG. HYDRARG. CO., B.P.

UNG. METHYL. SAL., B.P.C.

UNG. ZINCI OXID., B.P. etc. etc.





Colloid milling

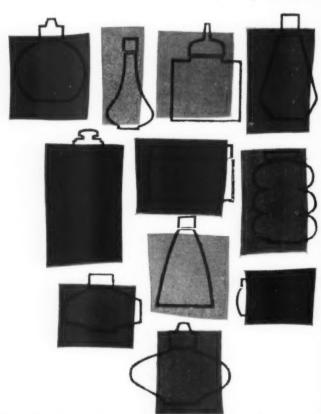


We also manufacture to customers' private formulae

STAFFORD ALLEN & SONS LIMITED, WHARF ROAD, LONDON, N.I. Telephone: CLERKENWELL 1000



Hold everything!



MB

THE METAL BOX COMPANY LIMITED

Plastics Group

37 Baker Street . London W.1 . Hunter 5577

Poly-Tainers are unbreakable, colourful, light in weight and economical.

They are supplied in a wide range of attractive shapes and sizes with dispenser attachments to spray, drop, pull or pour. Individual designs can be produced to meet your particular needs, with your brand name either embossed or printed in a variety of colours.

Poly-Tainer



March, 1958-Manufacturing Chemist



Armstrong

moulded

For every bottle there is an appropriate cap-correct for size, proportion, design, colour. In the search for it, you would do well to study the Armstrong range of moulded caps-standardised for economy and quick delivery, adaptable for colour and name incorporation. Or your own special project can be handled through the design and development stages.

We also specialise in standard caps for bottles to B.S.I. specifications. Armstrong Technical Representatives are ready to collaborate in simplifying your closure problems.

Caps ... in standard or exclusive designs

ARMSTRONG CORK COMPANY LIMITED, Closure Division, Kingsbury, London, N.W.9. Tel: CO Lindale 7080 Branch Offices: Royal Exchange Buildings, Market St., MANCHESTER 2. DEAnsgate 7311/2 & 8078 65 New St., BIRMINGHAM 2. Midland 7594/5. 39 Corn Exchange, LEEDS. 31194/5. 5 Oswald St., GLASGOW, C.1. CENtral 3554. 54 Middle Abbey St., DUBLIN. Dublin 43023

nist

CITRIC ACID BY STURGE

ELECTROPLATING

SEQUESTRATION

JAMS AND PRESERVES

MEDICINAL PREPARATIONS

RESINS AND PLASTICISERS

SOFT DRINKS

FOOD PROCESSING

CONFECTIONERY

Write for further information to:

JOHN & E. STURGE LIMITED, WHEELEYS ROAD, BIRMINGHAM 15

Telephone: Midland 1236

AN INDEPENDENT COMPANY MANUFACTURING FINE CHERICALE SINCE 1822

TGA CALL



new protection

with socyanates and POLYESTERS by



These new products give flexible and rigid foams that offer the packaging industry a range of extremely versatile packaging materials.

FLEXIBLE FOAMS are pre-formed in mattresses that are readily convertible to a variety of packaging applications.

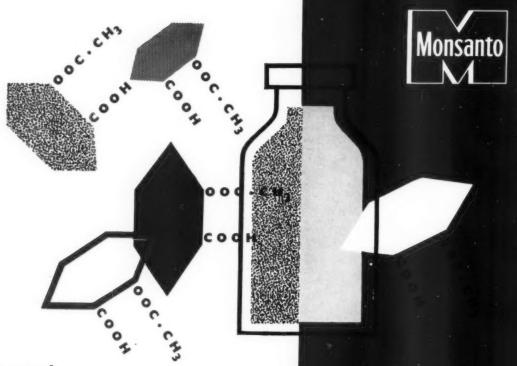
RIGID FOAMS can be easily formed, in situ, as protective casings for containers such as carboys. Both flexible and rigid foams provide excellent insulation against mechanical and thermal shock.

Ask for details of 'Daltolac' SF and 'Suprasec' SF for flexible foams and 'Daltolac' 21 and 'Suprasec' D for rigid foams.

Enquiries should be addressed to: I.C.I. Sales Development Department (Polyisocyanates), Ship Canal House, King Street, Manchester 2.

IMPERIAL CHEMICAL INDUSTRIES LIMITED LONDON SW1 ENGLAND

emist



Monsanto

ASPIRIN

outsells all others, because-

- 1. the quality is consistently high.
- it is available in crystals for direct tabletting eliminates slugging and wet granulation.
- it is available in a number of grades to suit every formula.
- 4. Monsanto are the only U.K. manufacturers of Phenacetin—so buyers obtain both chemicals from the one source.

Monsanto also make these chemicals specially for your industry: Methyl Salicylate B.P. Salicylic Acid B.P. Salicylic Acid (technical). Vanillin B.P. Sodium Salicylate B.P. Phenol B.P. Salicylamide. Sodium Benzoate B.P. Benzoic Acid B.P. Phenolphthalein B.P.

Write today for more information.



MONSANTO CHEMICALS LIMITED,

419 Monsanto House, Victoria Street, London, S.W.1, and at

In association with: Monsanto Chemical Company, St. Louis, U.S.A. Monsanto C Australia: Limited, Melbourne, Monsanto Chemicals of India Private Limited, Bombi Monsanto chemicals help industry to bring a better future closer



Flint and Amber glass and all sizes from ½-oz. to 90-oz. capacity
with wide mouth external screw for use with caps of black enamelled
tinplate, black or white Korkalite all fitted waxed pulpboard wads.





mist

UNITED GLASS BOTTLE MANUFACTURERS LTD.

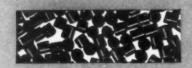
8 LEICESTER STREET, LONDON, W.C.2

Telephone: Gerrard 8611 (23 lines)

Telegrams: Unglaboman, Lesquare, London

Manufacturing Chemist-March, 1958

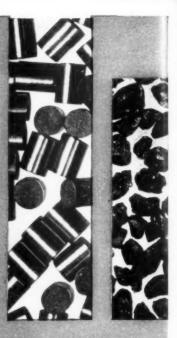
A31



I.C.I. PRESENTS

a range of

CATALYSTS



for the Heavy Chemical, Petroleum Chemical, and Petroleum Refining Industries.

The Billingham Division of I.C.I. has more than thirty years experience in the manufacture and use of catalysts for industrial chemical processes. Recent extensions to the catalyst-making plant now enable I.C.I. to offer a wide range of standard catalysts, and enquiries are invited for these and for other formulations (including catalyst supports) to meet specific requirements.

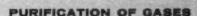


The range of I.C.I. catalysts covers:

HYDROGEN MANUFACTURE

Hydrocarbon reforming.

Carbon monoxide conversion.



Trace removal of carbon monoxide (by methanation), sulphur compounds, and oxygen.



HYDROGENATION AND DEHYDROGENATION REACTIONS

AMMONIA SYNTHESIS

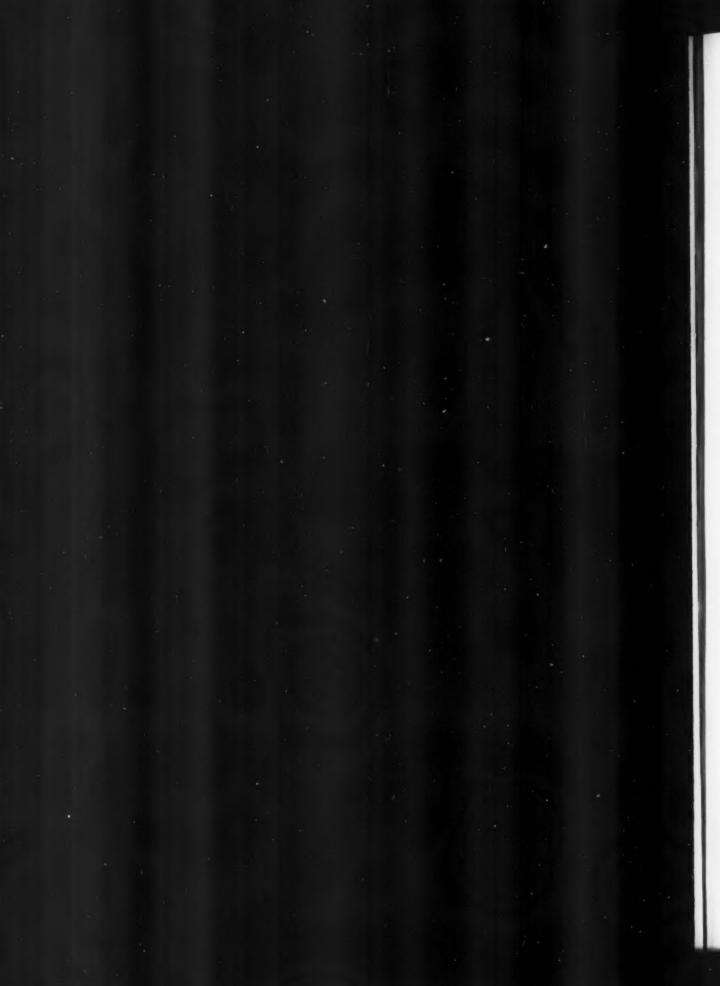
Full information on request:

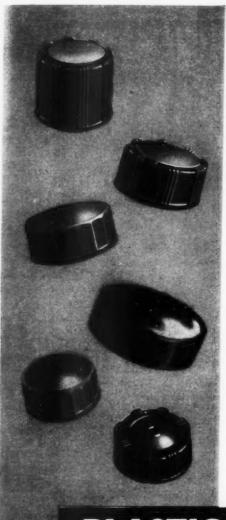
Imperial Chemical Industries Ltd., London, S.W.I.

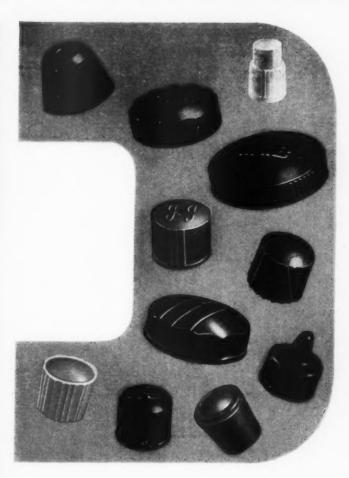


0.259

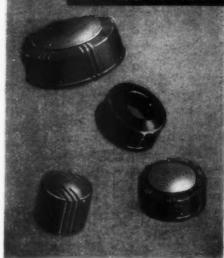








PLASTIC CLOSURES



Whether they're made to your special design or from standard dies, our caps are consistent. Consistent in colour, finish and quality. Minutely accurate in dimensions. Caps like these give the finishing touch to striking pack presentation. Contact us. We'll be glad to co-operate on any moulded closure project.

PLASTIC CLOSURES LTD.

BLAKEMORE RD., WEST BROMWICH, STAFFS



QUALITY

IN WHITE FLINT
GLASS CONTAINERS



RIBBED OVALS
1/2-02. to 16-02.
BOW-FRONT PANELS

OLIVE OIL BOTTLES
2½-oz., 5-oz. and 10-oz.
OVAL TABLET BOTTLES
Nos. Leo 7½ sizes

Nos. 1 to 7½ sizes.

ROUND SCREW JARS

Tall and Semi-squat.

PANEL FLATS

l oz to 4-oz.

RECTANGULAR TABLET BOTTLES

Nos. 1, 2, 3, 4, 5 and 6 sizes.





Prompt delivery from stock

Packed in easily handled cartons

WHOLESALE ONLY

NATIONAL GLASS WORKS (YORK) LTD.

FISHERGATE, YORK, Tel. YORK 23021 ALSO AT: 10S HATTON GARDEN, LONDON, E.C.1. Tel. HOLBORN 2146



Selling Agents in Northern Ireland: Magowan, Vicars (Chemicals) Limited, 64/66 Townsend Street, Belfast. Tel: Belfast 27830



FAIRWAY WORKS, CARLISLE STREET, SHEFFIELD 4

Telephone: 28751 Telegrams: FAIRWAY, SHEFFIELD 4

Supplied in conjunction with VISUAL EFFICIENCY LTD. 2 THE GREEN, RICHMOND, SURREY



Yes, customers certainly appreciate our expert know-how and craftsmanship in copper and stainless-steel fabrication. After all we have been doing it for quite a few years (since 1828 to be exact; we saw stainless-steel come in, of course).

And customers certainly appreciate, too, what are very reasonable prices for the highest grade of work. For plant for vacuum distillation, solvent recovery, essential oil extraction and distillation-see us first.

JOHN DORE & CO., LTD.,

22-32, Bromley High Street, Bromley-by-Bow,

London, E.3. 'Phone: AD Vance 3421 & 2136

Keen

-GET ALQUOTATION FROM



March, 1958-Manufacturing Chemist

THE PRESCRIPTION For improved Sales







































nsult a "Specialist" ality colour printing

WASS, PRITCHARD & Co. LTD

FENCHURCH STREET, LONDON, E.C.3

FOAM STABILITY and DETERGENCY with LORAMINE

As specialists in the manufacture of this important class of surface-active agents, we supply a wide range of unsurpassed quality, which includes:

FATTY ACID MONO-ALKYLOLAMIDES:

Monoethanolamides Monoisopropanolamides

FATTY ACID DI-ALKYLOLAMIDES:

Complex Diethanolamides

'High Amide' Diethanolamides

SPECIALISED ALKYLOLAMIDES:

General cosmetic and lipstick qualities
Foam Bath Concentrates

Our British and Continental laboratories have been responsible for the most up-to-date research in this field. This experience is entirely at YOUR disposal. For further information, please write er call.

DUTTON and REINISCH

130-132 Cromwell Road, London S.W.7

Telephone: FREmantle 6649 & 7777/8 Telegrams & Cables: CONDANO





Jew!

Musc 781

a macrocyclic musk



Polak & Schwarz (England) Ltd., 50 Great Cambridge Road, Enfield (Middlesex)



JOHNSEN & JORGENSEN (Flint Glass) LTD., 26/7 Farringdon Street, London, E.C.4. Phone: CENtral 9032



A NEW WITH NEW ROAD TO SUCCESS

AROMATIC CHEMICALS

ISO-BERGAMATE "DRAGOCO"

resembles the fragrance of the bergamot oil, along with a soft fruitiness and a delicate, woody background.

DRAGO-JASIMIA

to accentuate fine flower scents particularly for jasmin proven essential in deluxe perfumery.

LACTOSCATONE "DRAGOCO"

provides a typical fecal note with a warm animal background and a delicate woody note.



DRAGOCO HOLZMINDEN

Sole agents in U. K.: Messrs. BRUCE STARKE & Co. Ltd., 5, Fenchurch St., London E. C. 3. Phone: Mansion House 3586

CASCARA

Official preparations of Cascara Sagrada including Dry Extract B.P., granular; for tabletting.

CITRATES

Iron and Ammonium Citrate B.P., Potassium Citrate B.P. and Sodium Citrate B.P.—delivery from stock; competitive prices.

CODEINE

Codeine Phosphate B.P. "Special"—Smith, has a specification which makes it of interest to tablet manufacturers.

ESERINE

Alkaloid, Salicylate and Sulphate available in various packs including I grain tubes; quotations on request.

SANTONIN

Colourless, odourless crystals or white crystalline powder, offered in packs ith oz. upwards.

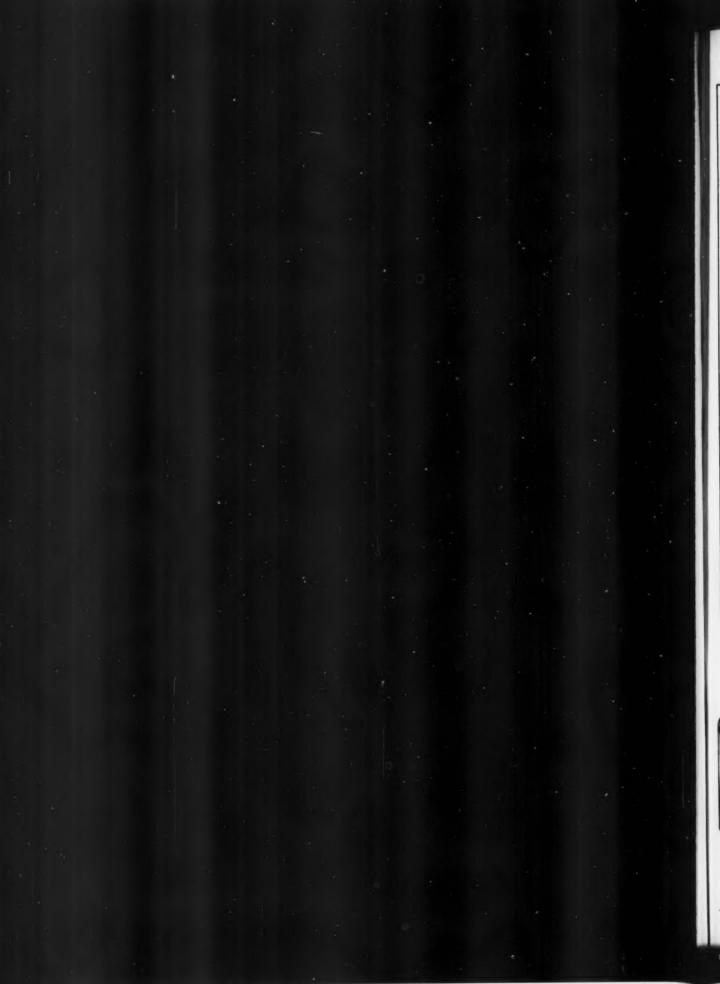


SMITH

OF EDINBURGH

T. & H. SMITH LTD · BLANDFIELD CHEMICAL WORKS · EDINBURGH II





The Beatson Tablet

- ★ Distinctive SQUARE Shape.
- * Black Plastic or White Enamelled Caps.
- ★ Full-automatic production.
- * Prompt Despatch from Stock.
- * Available in the following sizes-

1 1 1 1 1 1 2 3 oz.

"The Sign of a



Good Bottle"

Suggested Packs-

¿-oz.— 25 Aspirin.

1-oz. - 50 Aspirin or

25 Codeine. 13-oz.-100 Aspirin or

50 Codeine.

31-oz.—100 Codeine.

GLASS BOTTLE MANUFACTURERS ROTHERHAM ESTABLISHED 1751 YORKS.











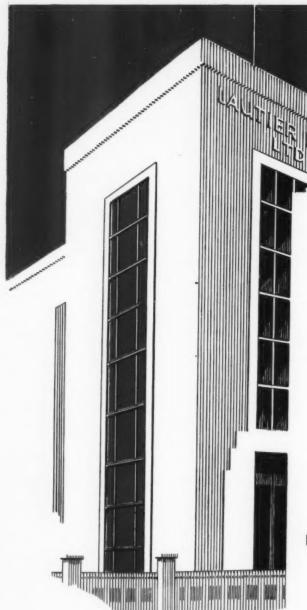


AMBER





Be sure to specify BEATSON



Specialists in

PERFUMES & DEODORANTS

for Commercial use in

-SPRAYS-

-DISINFECTANTS-

-AEROSOLS-

-POLISHES-

also

UNUSUAL MEDIA

ESSENTIAL OILS B.P. and B.P.C. and FINE AROMATICS

<LAUTIER FILS>



LAUTIER FILS LTD . POWER ROAD . LONDON W 4 . Telephone: CHIswick 1441

A44

March, 1958-Manufacturing Chemist

For packaging the shape of things to come (and to go)...



Call in the REED SERVICE

GOOD PACKAGE DESIGN prevents losses caused by damage in transit—including loss of goodwill. Reed will provide the answer to your packaging problems. Pioneers in corrugated fibreboard cases, Reed offer a unique service.

EIGHT-FACTORY NETWORK. Reed production facilities embrace eight factories 'on permanent call'. This means that any order can be carried out promptly and efficiently, at competitive prices, in any part of the country.

Our Representative is backed by the greatest organisation of its kind in the U.K.

Reed Packaging Service to Industry

REED CORRUGATED CASES LIMITED

GREAT WEST ROAD · BRENTFORD · MIDDLESEX

Tel: EALing 4555

BIRMINGHAM · CAMBRIDGE · EDINBURGH · MANCHESTER · NEW HYTHE (Maidstone)
TOVIL (Maidstone) · WARRENPOINT (Northern Ireland)



manloves

LET US SOLVE YOUR DRYING PROBLEMS

ROTARY DRYING MACHINES FILTER PRESSES FILM DRYERS CENTRIFUGALS

Samples of materials can be tested for suitability in our Laboratory

MANLOVE ALLIOTT & CO LTD

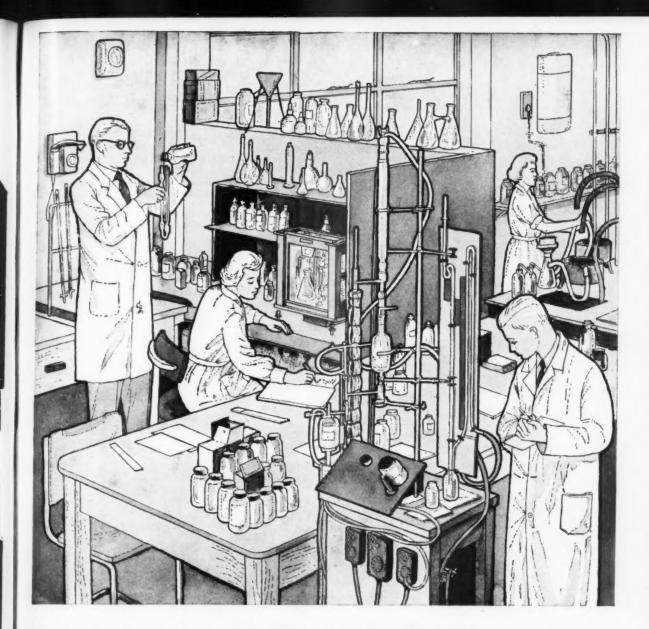
NOTTINGHAM

BLOOMSGROVE WORKS NOTTINGHAM

London Office 41842 PARLIAMENT STREET WESTMINSTER SWI

Telegrams MANLOVES NOTTM.

M



Your Laboratory in Marchon's Factory

The science in this laboratory is indeed 'applied'—to the practical problems of Marchon Customers. Here, with apparatus ranging from the most abstrusely scientific to the humble but informative dish-mop, members of the Sales Service team study what happens to the individual Marchon product when formulated, packed and used in a specific industrial or domestic application.

This fully-equipped laboratory is distinct from those engaged in Development Research on the one hand and day-to-day Quality Control on the other—it exists purely to assist the individual customer.

AGENTS AND OFFICES IN PRINCIPAL CITIES OF THE WORLD

HEAD OFFICE: Whitchaven, England. Telephone: Whitchaven 3131. Telegrams: Marchonpro, Whitchaven, Telex.
LONDON OFFICE: 140 Park Lane, London, W.1. Telephone: Mayfair 7385. Telegrams: Marchonpro, London, Telex.

Member of the Albright & Wilson Group of Companies.

Manufacturers of: Fatty alcobol sulphates (EMPICOLS), Emulsifiers (EMPILANS), Self-emulsifying waxes (EMPILANS), Alkyl aryl sulphonates (NANSAS) and other detergent bases in powder, paste and liquid forms: Fatty alcobols (LAUREX); Phosphoric acid and complex phosphates (EMPIPHOS).



PRODUCTS LIMITED

34

A47

MAR 9736

... sterile air ... pressurised buildings ... high
efficiency filters, vital for chemical processes ...
equipment that extracts 99% of all dust particles,
down to one micron in size ... filters that require
cleaning only once a year ... for air treatment,
designed to your exact requirements, contact Mr. Dawson
of Weatherfoil's Air Treatment Division
185 Bath Road, Slough, Bucks.
Telephone: Slough 25561

Ma

MANUFACTURING CHEMIST

and Manufacturing Perfumer

Vol. XXIX, No. 3	Cont	ents	MARCH,	1958
Topics and comments:	93	Scotland's New £3 million Fertiliser W	Vorks	109
Ban on penicillin?; Boost for Biostat; A chemical engine?; A giant grows larger; Two-way stretch; Poisons in plastics; Hazardous waste; Amino-acids and atomics; Powerful weedkiller; More vigilance		Thiazoles and Analogues By E. G. Curphey		111
needed; Aerosol boom		Progress Reports:		
Corticosteroids from Bile Acids	97	Hormones		113
Treatment of Glue and Gelatine with Formaldehyde	103	By C. A. Finch, M.A., D.PHIL.		
By A. M. Kragh, B.SC.	•	Fertilisers and Plant Nutrients By D. P. Hopkins, B.SC., F.R.I.C.		116
Non-Ionic Surface Active Agents-1. Chemistry		by Deriving Block, Pikelie.		
and Manufacture	105	Personal Recollections of the Victor	orian Dru	g
By Leon Raphael, M.SC., F.R.I.C.		Industry		132
REGULAR FEATURES: PLANT AND EQUIPMENT I	18 •	BOOK REVIEWS 121 . NOTES AND	NOTION C	S 122
NEWS 123 • PEOPLE 125 • NEWS FROM AI MEETINGS 129 • NEW COM		126 • TRADE MARKS 127 • NEV 129 • CHEMICAL MARKET 130	V PATENTS	S 128

A Publication of the Leonard Hill Technical Group—ENGLAND: Leonard Hill House, Eden Street, London, N.W.1 (Euston 5911); UNITED STATES: 3 Villa Drive, N.E. Atlanta, Georgia; 498, S. San Vincente Blvd., Los Angeles 48, California, Webster 3-5706; 1808, Union Bower Road, Irving, Texas; 121, Ward Parkway, Kansas City, 12. Mo.; Room 5632, Grand Central Terminal, New York 17, N.Y.; 681, Market Street, San Francisco 5, California, Exbrook 2-2612; ITALY: Via Filippo Turati 3 (Palazzo Giardino), Milan; SWITZERLAND: Sulgenbachstrasse 36, Berne; HOLLAND: Central Bureau Voor Verkoopontwikkeling, Vechstraat 10, Heemstede. Haarlem; GERMANY: Auf der Reide 20a, Dusseldorf-Unterrath; FRANCE: 63 Avenue Kléber, Paris XVIe



The quality of all BAKER products is derived from the high purity and uniformity of the metals and alloys employed, the painstaking skill of experienced craftsmen, and the close supervision and inspection

given at every stage of manufacture. Our comprehensive standard range of Platinum apparatus has been compiled to assist users in selecting what is most suited to their needs. In cases where a catalogued specification fails to meet requirements, we will gladly manufacture in accordance with customer's own designs.

REPAIR AND EXCHANGE SERVICE

We will always undertake to repair damaged Platinum vessels or other apparatus when possible. Where repair is not possible, users are invited to avail themselves of the generous terms afforded them by our Exchange Service.

Fully illustrated leaflet, including the new Polygon Shaped Crucibles, forwarded on application. Technical representatives are always available for consultation and advice.

ENGELHARD INDUSTRIES, LTD. BAKER PLATINUM DIVISION

52 HIGH HOLBORN · LONDON · W.C.1

Telephone: CHAncery 8711

ist



Wood engraving by John Farleigh

The Floating Mountain

THE WRITINGS of Ibn-Battutah, a 14th-century traveller, make lively reading. Once, in the Java Sea, his boat was caught in the monsoon and tossed about for forty days. Suddenly the clouds lifted and the seamen saw a mountain rising from the sea. The whirlwind rushed them towards it. When they were but ten miles away the mountain seemed to hover between sky and sea. The sailors wept, and bade one another farewell. "What we thought was a mountain is a roc. This monster bird will surely destroy us." But all at once a favourable wind arose and carried them to safety. So Ibn-Battutah never knew what he had seen—an airborne mountain or the legendary roc.

Unearthly dangers no longer menace travellers. But there are mundane risks enough that travelling merchandise must face. That is why modern manufacturers protect their goods with cartons of 'Thames Board', and 'Fiberite' cases in solid or in corrugated fibreboard.

THAMES BOARD MILLS LIMITED

Purfleet Essex and Warrington Lancs



THE LARGEST MANUFACTURERS OF BOARD AND PACKING CASES IN BRITAIN

78 82-8088-120

Aço

March, 1958-Manufacturing Chemist

TOPICS AND COMMENTS

A ban on penicillin?

THE expanding market for penicillin mastitis remedies is being jeopardised in the United States owing to the fairly widespread occurrence of the antibiotic in milk supplies. The U.S. Food and Drugs Administration has been concerned about the problem for some years and has conducted regular analyses of milk for penicillin. In a series of tests over three years nearly 7% of all samples contained penicillin in concentrations varying from 0.003 to 0.550 units per millilitre. While penicillin in this concentration is unlikely to harm normal persons, it is considered that it might cause a reaction in a highly sensitive individual. In the U.S. it is estimated that there are 17 million people who may react unfavourably to a contact with antibiotics. Accordingly farmers have been asked to discard for human consumption milk from cows treated with antibiotic mastitis remedies for a period of three days after the last treatment. Furthermore the authorities have limited the penicillin content of mastitis remedies to 100,000 units per dose. If these procedures are not effective, it may be necessary to ban the use of penicillin in mastitis preparations in the U.S.

This warning is given by Dr. Henry Welch, director of the antibiotics division of the F.D.A., in an article in *Science* (1957, (3284), 1159). The scriousness of such a prohibition may be gauged from the fact that more than 75 tons of antibiotics are used yearly in mastitis remedies, penicillin preponderating. In a single treatment an animal may be given 500,000 units of penicillin, 500 mg. of dihydrostreptomycin, 50 mg. of neomycin and 750 mg. each of sulphanilamide and sulphathiazole. If the infection is severe the animal may receive four times these amounts in a 48 hr. period.

Although the U.S. is one of the few countries to approve the limited use of antibiotics for food preservation, Dr. Welch makes it clear that the policy is to move very cautiously and to insist on conclusive proof that harmful residues do not persist through the cooking process before further approvals are granted. Approval so far is limited to chlortetracycline and oxytetracycline for preserving raw poultry. Meanwhile experiments on a large scale continue, both in the U.S. and other countries.

Boost for Biostat

One of the latest uses of oxytetracycline (Biostat formulation) in the food field is the preservation of whale carcases. The preparation is injected into the whale either at the time of harpooning or just after, and it is claimed to retard spoilage by bacterial decay which is normally accelerated by

the heat retained in the whale's body. According to Pfizer, manufacturers of the preparation, a Norwegian whaling company has been able to extend its whale hunts to a distance of 300 miles from land compared with the 200 miles limit normally imposed by the decay problem. In short, Biostat enables whales to keep fresh longer before processing. This seems a wholly innocuous and beneficial use of an antibiotic, since it is unlikely that harmful residues could persist through the processing to which whale oil is subjected in food manufacture.

A chemical engine?

THE POSSIBILITY of getting mechanical work directly from chemical reactions was one of the intriguing vistas opened up by Dr. H. W. Melville, F.R.S., secretary of the D.S.I.R., in his Kelvin lecture before the Institution of Electrical Engineers. The system would be based on the use of ionexchange fibres which resemble animal muscle in mechano-chemical behaviour. The precise chemical structure of the fibre is unknown, but it is made by mixing high polymer molecules containing acid groups with those containing alcohol groups. These fibres can be made to contract when in contact with one type of solution and expand when in contact with another, thus performing mechanical work. Thus the fibre swells in contact with an acid. If the acid medium is replaced by an alkaline medium the hydroxyl ions will react with the H+ ions attached to the outside of the fibre to yield water and the fibre will be left with a negative electrical charge. These charges cause the molecules to stretch by electrostatic repulsion. Finally the fibre can be brought back to its original state by placing it in an acid bath. Thus mechanical work is done as a result of the neutralisation of an acid by a base with the production of water.

The efficiency of this mechano-chemical system is only 1%, said Dr. Melville, but no real attempt has yet been made to get the optimum from such fibres for this kind of engine and no doubt a much better performance could be achieved. After all, even modern locomotives operate at an efficiency of only about 5%.

Another of Dr. Melville's predictions is that we might be able to get much stronger synthetic fibres than those made so far. Even the strongest natural and synthetic fibres have a tensile strength of only about 10 grammes per denier and, surprisingly enough, this figure seems to be independent of chemical constitution. From this it might be thought that the figure represents the ultimate-strength of this kind of matter, i.e. the strength of the chemical bonds comprising the fibre. But in fact fibres have only about one-hundredth of the

strength calculated in this way. Even assuming that the fibre breaks by the chains sliding past each other, the molecules of the polymer remaining intact, actual strengths are less than theory predicts. "It is therefore tempting to speculate that much stronger fibres might yet be produced," concludes Dr. Melville.

Two-way stretch

STRETCHABLE kraft paper is the latest invention. It has been developed in the U.S. by Sanford Cluett, originator of the Sanforizing process, and West Virginia Pulp and Paper Co. The stretch is put in mechanically. During the drying process paper is fed in to a rubber belt and expanded with the belt as it runs beneath a dryer roll. When the pressure is released the rubber belt returns to its original length and so does the paper. The fibres are thus pushed and twisted back. Careful control of heat and moisture at this stage prevents the paper from wrinkling. About 10% stretch is put in in one direction and 5% in the other. The paper is claimed to resist shock and impact much better than ordinary paper and is recommended for multi-wall sacks. The process can also make the paper soft and pliable.

A giant grows larger

THE AMERICAN chemical industry is selling more and spending more than ever before, but its profits are getting smaller. The industry's assets have risen to a fantastic 19-2 billion dollars, making it the third largest manufacturing industry in the U.S. Of course the industry covers a much wider range of products than that usually denoted by "chemical," including textile fibres, synthetic rubber and a number of metals and alloys. All of these diverse activities are carried on by members of the Manufacturing Chemists' Association, which represents more than 90% of the American chemical industry.

Sales in 1957 were about 24.4 billion dollars, 7% more than the previous year and 115% more than in 1946. This year the industry expects sales to reach more than 25 billion dollars. But profits are being squeezed. In 1956 they were 8.3% of turnover but last year they fell to 7.8%. Intense competition is keeping prices down; although they rose by 2.5 points in 1957 they are still only 10% above the 1947-49 base, compared with a general price increase of 26%. As in Britain chemical prices have an excellent reputation for stability.

Already the American chemical industry employs 837,000 who make 11,000 different products in 12,000 plants. These figures will have to be revised upwards within a couple of years because 2.54 billion dollars will be spent on new plants and research facilities between now and the end of next year. No less than 107,215,000 dollars will be spent on laboratories, indicating an increase in the 500 million dollars p.a. already spent on research.

Poisons in plastics

IT COMES as something of a shock to realise that in eliminating the risk of external contamination of food by wrapping it in plastic films another risk is introduced, namely the poisoning of the food by ingredients of the plastic composition. Fortunately this is only a risk; no single case of poisoning through plastics has been known in this country. However, the constant introduction of new plasticisers, lubricants, stabilisers, colours and fillers has thrown suspicion on plastics. Before these suspicions have been confirmed by an accident, the British Plastics Federation has acted. Two and a half years ago it set up a Toxicity Sub-committee which has been going to a lot of trouble to gather evidence and information on which to base standards for plastics for use in contact with food.

The report points out that before any constituent of a plastic can constitute a hazard to health, it must be both inherently toxic and also extractable in dangerous amounts from the material in which it is contained. Nevertheless, it recommends that no scheduled poison should be added to a plastic intended for use in contact with foodstuffs, irrespective of considerations of extractability.

The report then goes on to enumerate the requirements of an adequate extractability test, and suggests a specific procedure which it is hoped will be adopted as standard practice throughout the industry. This procedure consists essentially of extracting the plastic material with water, acid, alkali, alcohol and oil under standard conditions of concentration, time and temperature that are sufficiently severe to cover the most adverse conditions to which the plastic material is likely to be subjected in practice. Extracts are then analysed for their content of the suspected material. Amounts of the material extracted are expressed in relationship to the weight of the original plastic in the case of thin films and to surface area of the plastic in the case of heavier materials, and a formula is suggested for relating the determined extractability of a substance to its known toxic properties in terms of a "Toxicity Quotient."

Finally, the report classifies into three groups, corresponding roughly to safe, suspect and toxic, a large number of plasticisers, stabilisers and other materials used in the plastics industry.

The limit set by the committee on toxic materials is one-thousandth of any dose that can give rise to discomfort. This is a satisfactory standard and it is to be hoped that the scheme, which is a voluntary one, will be accepted and implemented by the plastics industry. The food industry can exercise the most powerful influence of all by refusing to use plastics which do not bear the approval stamp of the Plastics Federation.

af clivit in of cdiif

Meanwhile the Food Standards Committee might examine the standards with a view to giving them legal status. At present there is no official ruling on these matters and the law concerning toxic ingredients in food wrappers needs clarification.

Hazardous waste

t in

of

risk

tely

ing

try.

sti-

lers

ese

ent,

and

tee

her

an-

od.

ent

, it

ble

ich

hat

stic

ir-

ire-

and

vill

the

of

eid,

ons

are

rse

ely

en

ial.

sed

tic

he

ula

ct-

er-

ps,

, a

ner

xic

an

ry

ne.

nd

od

ce

ear

ht

em

ng

cie

ist

Many aspects of waste disposal arising from the wide-scale use of radioisotopes were discussed by Dr. W. G. Marley at a recent conference held in The release of radioactive nuclides in the form of dust or vapour over agricultural land can lead to the entry of nuclides into the human food chain, either by direct contamination of crops used for human consumption, or by contamination of herbage which is grazed by dairy cattle. Extensive studies have been made on the behaviour of Sr⁹⁰ in the human food chain and the subsequent buildup in the human body. Biological concentration also occurs to a significant extent in aqueous systems, and concentrations in plankton and water fowl of isotopes such as P32 have been observed to exceed 10,000 times that in the water, In surveys of radioactivity in fish in White Oak Lake in the Oak Ridge National Laboratory, U.S.A., it was found that every fish assayed had selectively accumulated radioactive materials in the tissues far in excess of the amounts which occurred in the water in which they lived. These studies suggest that in circumstances where large numbers of fish are caught and eaten by riverside populations the level of activity in the fish may become the limiting hazard, rather than that of the water which may be used for drinking purposes. Another aspect of the build-up of activity in biological organisms is that the water is incidentally cleaned up considerably by absorption on biological organisms and mud. Corresponding concentrations in marine plankton and fish have been observed in studies on the fate of radioactivity in sea water, and it is apparent that biological concentration factors are of predominant importance in any coastwise disposal of active wastes.

The principal sources of radioactive wastes which are of concern to public health, and which arise from the uses of radioactive isotopes, are hospitals, industry and research institutes, and university laboratories. The problem of radioactive wastes from the various applications of radioactive isotopes is dwarfed by the radioactive waste problems arising from factories processing isotopes or manufacturing isotope appliances, and especially from certain atomic energy processes. The permissible level of discharge to rivers depends on the use which is made of the water. Considerable quantities of radioactivity may be safely discharged when there is no subsequent human drinking. By grouping the radioactive isotopes according to the order of the permissible levels of ingestion, a simple formula may be derived which enables routine control by simple radiochemical assays of the different classes of activity. This method is used in the active waste discharge to the River Thames from the Atomic Energy Research Establishment at Harwell. In this case, the population involved is over 6 million.

There are four principal methods of disposing of solid wastes, viz. incineration, closed storage, open burial and sea disposal. The general recommendations are that in each district where significant quantities of radioactive materials are utilised a careful survey should be made of the sources of drinking water. It is desirable to ensure that trade wastes carrying large quantities of radioactive materials are conducted away in trade sewers to a tidal estuary so that drinking water pollution cannot arise. It is important to recognise that the public health hazards from these materials are to a large extent nation-wide and legislation which involves local control is often inadequate. This is particularly the case with radioactive pollution of rivers.

With careful planning and proper quantitative supervision of the disposal procedure, there is no doubt that the widespread use of radioactive nuclides in scientific research, in medicine, and in all branches of industrial technology can be greatly expanded without any risk to public health.

Amino-acids and atomics

ANTI-RADIATION preparations, which might minimise the effects of exposure to radiations, have long been the subject of research. Out of such work have emerged a few really promising compounds, but they have so far suffered from the drawback that their administration must precede the radiation exposure.

Recent developments in India suggest that this picture may now well change. It appears that methionine, a sulphur-containing amino-acid which had previously been shown to prevent excessive radiation damage if given before the irradiation, is in fact more efficacious if given after the exposure. Methionine is very radiolabile, i.e., it alters under the effect of radiation, so that if given before radiation commences the latter may well render it useless, so that no protective action can be exerted. Administration after the dose of radiation allows full use to be made of the protective action.

Methionine appears to be vitally concerned with the synthesis in vivo of deoxyribonucleic acid, one of the all-important constituents of cell nuclei, and hence involved in genetic and cell division mechanisms. Methionine plays a part in the processes of transmethylation and phosphorylation which are stages in the D.N.A. synthesis. Hence, it is not surprising that it should show value in the repair of tissue damage, including that due to radiation. Methionine has already shown some advantage in the recovery of tissues after serious burns, and it has a revitalising action in several animal tissues.

Atomics comments: " If this discovery should be confirmed by other workers, it may well be the starting-point for a very fruitful line of research. Whether mankind is heading for nuclear warfare or not there will for some years to come be a place for any substance which can counter the lesions caused by radiations, for radioactivity is likely to play increasing rôles in human pursuits for many years

Powerful weedkiller

STRONG HERBICIDAL properties have been discovered in a quaternary ammonium compound by I.C.I. workers at Jealott's Hill Research Station. The chemical—1:1' - ethylene - 2:2' - dipyridylium dibromide—was prepared at I.C.I.'s Blackley laboratories by R. J. Fielden by the quaternisation of 2: 2-dipyridyl with ethylene dibromide. It is readily soluble and is stable in acid or neutral solution.

In greenhouse tests it completely destroyed wheat, sugar beet, white mustard, marigold, red clover and cleavers at dosages as low as ½ lb. per acre. Even at 1 lb. per acre it seriously damaged all the plants other than cleavers. It was almost equally effective without a wetter being added to solutions, though in this case it was less damaging to wheat and clover.

Reporting their results in Nature (1958 (4607), 446-7), the I.C.I. workers—Brian, Homer, Stubbs and Jones—say that the new herbicide is systemic but cannot be applied through roots by drenching the soil, because it is rapidly and completely absorbed by soil. It is highly active against several common weeds at 1 to 1 lb. per acre, including species resistant to the well-established 2,4-D and MCPA; but it is not a selective herbicide in the accepted sense. Tests so far indicate that it is most effective for potato haulm destruction, crop desiccation and general non-selective weedkilling. It may find some use as a selective herbicide in cereals. More research is needed to discover this and other possibilities of the newcomer in the weedkiller stakes.

More vigilance needed

ACCIDENTS in which hospital patients are given the wrong drug or the wrong dosage, usually with fatal results, are fortunately rare. Nevertheless the fact that they happen must lead to disquiet about hospital methods of controlling dangerous drugs. Now we have the report of a committee set up by the Ministry of Health to investigate current methods of controlling dangerous drugs and poisons in hospitals (H.M.S.O. 2s.) The committee were "much impressed" with the elaborate precautions that nursing staff must take and the difficulty of keeping the necessary records, and they make nearly 40 suggestions for improving matters. These suggestions have been commended to hospital authorities by the Minister of Heath, Mr. Walker-Smith, and it is to be hoped that they will be implemented.

The committee strongly urges the uniform adoption of standard procedures for controlling and issuing dangerous drugs and scheduled poisons in hospitals. Standardisation is immensely important because with the introduction of the National Health Service staff tend to change their jobs much more frequently than before. At present this almost invariably means that nurses have to learn new

systems for controlling drugs when they move to other hospitals. Standardisation of practice in such vital matters is surely one of the benefits that should be forthcoming from nationalised medicine.

One rather sensational disclosure in the report is that there are a few drug addicts among hospital staffs. The authorities are generally reluctant to take legal proceedings against these people when they are discovered, and the usual result is resignation "on personal grounds," the whole matter thereupon being dropped. While this avoids scandal it does not help the unfortunate addict or the even more unfortunate hospital to which he or she may go next, this apparently not being unknown. The Minister adjures hospital authorities to ensure that addicts are reported to the police and given proper treatment. It is also necessary for hospitals to be more careful in checking the credentials of prospective employees.

Aerosols boom

Plastics and glass containers, as well as the original aluminium and tinplate ones, are now available to the aerosol packaging industry. The market is booming; within six years the number of aerosol packs sold multiplied sixteen times, from half-a-million to eight million in 1956.

Extruded aluminium containers, the first to be marketed in Britain, are still favoured for cosmetics because their seamless construction lends itself to overall decoration. Cans of 20, 12, 6 and 4 oz. nominal capacity are available and smaller sizes of 1 oz. or less may soon be introduced.

Tinplate containers are now available in 4, 6, 12 and 16 oz. sizes. Experiments have been carried out to produce a stronger side-seam which will increase the safety of the containers.

Glass aerosol containers have obvious advantages of corrosion-resistance. Means have been devised to protect the glass against the hazards of breakage.

In the field of all-plastics containers extensive research has been carried out in connection with blow-moulded nylon bottles, and high-density polythene has also been investigated. A spherical high-density polythene aerosol containing a perfumed air-freshener is now being sold in this country.

A wide range of aerosol pressures can be obtained by utilising various propellant mixtures. Normal internal pressure at room temperature is between 35-45 lb. per sq. in. gauge. In the case of glass

bottles, pressures are appreciably lower.

Aerosols for the domestic market are achieving the widest sales. Among these is the Zonk range which includes air purifier, household insecticide, moth proofer and oven cleaner. The use of aerosols has also spread to industry, for example, silicone mould-release agents and flaw detection inks. The latter are used to detect cracks in castings. Two aerosols are required. The first sprays a solution of a dyestuff and the second dispenses micronised chalk which shows up the cracks where the dyestuff has been absorbed.



Corticosteroids from Bile Acids

UCLAF'S NEW FACTORY IN EAST LONDON

Uclaf Ltd., subsidiary of the Roussel Group of Paris, have spent half a million pounds on the purchase and equipping of a fine chemicals factory at Stratford, East London. The factory's only products so far are corticosteroids derived from bile acids. Here is an impression of the complex equipment and meticulous planning required for this process.

CORTICOSTEROIDS are now made by three firms in Britain, each of which uses a different raw material. Glaxo starts from hecogenin derived from the sisal plant, Boots use diosgenin obtained from the root of Elephant's Foot (Testudinaria sylvatica) and Uclaf use Australian ox bile. The products of the third firm will be better known in this country under the name of Roussel Laboratories Ltd. This is the British branch of the famous Roussel group of Paris which was established by Dr. Roussel some 47 years ago and is now one of the biggest pharmaceutical groups in the world. Uclaf S.A. is the manufacturing associate of Roussel in France. This arrangement has now been duplicated in Britain with the formation in 1956 of Uclaf Ltd., to manufacture fine

to

he he er om be

elf oz.

es 12

ed ill

es

ed

re

h

V

al

r-

٧.

d

al

n

S

g

e

e

0

t

in hat ine. t is ital to nen nater ids or or ınles ice for en-

> chemicals for the pharmaceutical industry and in particular for Roussel Laboratories.

Manufacture of pharmaceutical products was started by Roussel in Britain in 1950 at a factory in Harrow Road, Willesden, North London. Eventually the final stages of cortisone manufacture were carried out there from 1953 1957 (see Manufacturing Снеміят, June 1954, pp. 239-41). With the formation of Uclaf and the acquisition of a factory in Marshgate Lane, Stratford, East London, production is now on a much larger scale. Eventually

Above: In these stainless steel and glasslined vessels equipped with a variety of stirrers, a whole series of reactions is carried out, ranging from dehydrobromination to hydrolysis.

it is intended to carry out the whole complex and lengthy process of cortisone manufacture from raw ox bile. Currently at Stratford about two-thirds of the process is carried out, the semi-processed material being imported from Uclaf in Paris. Even to reach this stage, however, some half a million pounds have had to be invested in buildings, services, equipment and plant. The products manufactured are: cortisone, hydrocortisone, prednisone (delta cortisone), prednisolone hydrocortisone) and their acetates. These are sold as pharmaceuticals by Roussel under the trade names of Cortisyl, Hydrocortisyl, Decortisyl and Precortisyl.

The factory

The buildings in Marshgate Lane

stand on a site of about 4 acres. They were built by a fertiliser company in 1949, primarily for compounding and warehousing. All buildings, including the office block, are single storied. There is plenty of room for expansion.

The factory is in the industrial area of Stratford and is extremely well placed, being both near to its raw material suppliers and to the Roussel premises at Harrow Road where the final pharmaceutical

processing is done.

The premises, of which Uclaf hold the freehold, were occupied in August 1956. In order to get production going as soon as possible the equipment of the factory was, in a sense, carried out backwards. The first sector to be equipped was for the final steps of the process, using intermediates from France as the starting-point. Since then the equipment of each sector has taken the process back towards the bile paste.

Nearly every piece of plant has the following services available on

tap:

Steam
 Brine at - 15°C.

(3) Cooling water.

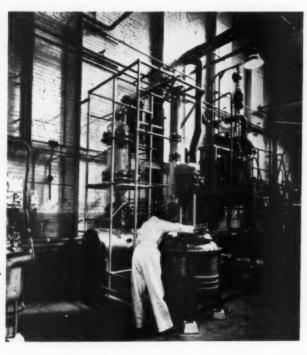
- (4) Vacuum for distillation under greatly reduced pressure. The purpose is to remove volatile solvents at a much lower temperature than their normal boiling-points, which means there is no danger to the delicate product through overheating and consequent decomposition to a gum.
- Vacuum to assist rapid filtration.
- (6) Vacuum to give rapid and complete drying in special ovens, again without overheating the product.

(7) Process water.

- (8) Demineralised water for reactions which cannot be carried out with hard tap water.
- (9) Nitrogen for purging air out of vessels in which oxygensensitive reactions are carried out.

Most of these services are generated in a building specially erected for this purpose. This is away from the main block and the services are piped underground to the production building.

Steam is raised in a fully automatic oil-fired economic boiler capacity 10,000 lb. per hr. at a



A stainless steel reaction vessel used for reductions.

working pressure of 100 p.s.i. There are no superheaters. The boiler also heats the factory and offices. There is space beside the boiler for further expansion.

Demineralised water is produced by the Permutit system. The water passes in turn through two columns. In the first, the "HI unit," the metallic radicals of the salts are removed, and in the second the acidic radicals are eliminated. The final water, apart from small quantities of dissolved carbon dioxide, is in all important respects as good for production purposes as distilled water.

Nitrogen is purchased in cylinders and distributed from a large manifold at the side of the produc-

tion building.

Brine is made in an ammonia type refrigeration plant with water cooled condensers. It consists of three ammonia compressors driven by 25 h.p. motors; operation is fully automatic, cutting in and out as the brine temperature alters. Ice for production is also made from demineralised water in the brine plant.

Ice takes about six hours to make. Water is supplied through a 6 in. main into two 30,000 gal. storage tanks. There is a small pumping station for circulating the water round the factory. There is no artificial cooling at the present,

but this will probably be necessary as expansion proceeds.

Vacuum is produced in wet type pumps varying in size according to the amount of air to be removed from the particular process on which they are operating.

Stores

Many of the raw materials used are inflammable solvents, and for this reason most stores are kept out of doors. Different coloured flags indicate whether a material is inflammable, poisonous or harmeless. Numbers on the flags and on the drums are part of a system of control which ensures—

a. That the control laboratory immediately samples every delivery of material received.

b. That no material can possibly be issued to the production department until it has been tested and accepted by the laboratory.

c. That all materials are used up in the same sequence as they are delivered, so that nothing deteriorates before use.

For storing glacial acetic acid and certain solvents a hot store-house has been built in which the temperature is kept at a constant 35°C. The drums of material are hoisted to the top of a bank of racks and descend to the take-off

point via a system of sloping shelves.

Planning

Over 90 different materials are used to make cortisone from bile paste. The whole process takes many weeks and at every stage it is vital that all raw materials of the right quality are immediately available for use. The ordering and obtaining of supplies in the right quantity and quality at the right time is thus a complex operation. This is the responsibility of the Planning Section. Calculations are made of quantities of all materials required at every stage of the process. Materials are then ordered in sufficient quantities to last for a certain time. The period to be covered by an order for a particular material is fixed by taking into account a number of factors; among these are-

a. Price (i.e. how much money will be locked up at a time).

b. Delivery time from the supplier (special allowance is made for materials which have to be imported).

Frequent and regular checks are

then kept on the actual usage of the material compared with the theoretical, so that purchases can be brought forward or delayed as and when necessary.

Safety

Owing to the inflammable nature of many of the raw materials, very stringent safety precautions are enforced. Some of these precautions have added greatly to the cost of the installation.

Examples are:

(1) Completely flameproof electrical wiring, motors, etc., in every production sector.

(2) Electrical earthing of every piece of equipment to prevent possible sparks following the generation of static electricity. Even portable apparatus is earthed during use.

(3) Only rubber or leather shoes are worn by production workers, no nailed boots.

Manufacturing process

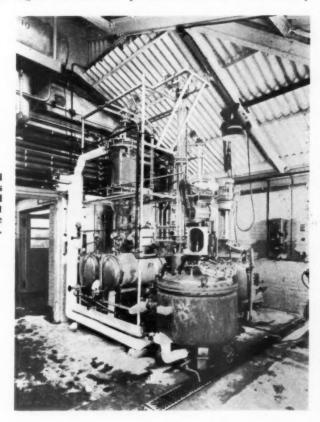
No precise details of the processes used by Uclaf are available. In principle, however, they use processes based on those already

published and well known in this branch of pharmaceutical manufacture. The assorted steroids in ox bile are converted into suitable starting materials for cortisone preparation by drastic oxidations. Cholic and desoxycholic acid are first extracted from ox bile, the former in larger yield. The aim is then to convert all the cholic acid into desoxycholic acid from which is obtained the most important starting material - methyl 3a: 7a - diacetoxy - 12 - ketochola nate.

The first requirement of the synthesis is to introduce a 7:9(11)diene system into the B and C rings of the molecule. Several methods are available for doing this; a typical one, probably of the greatest general use, involves oxidation of the above methyl ester with selenium dioxide to methyl 3a: 7a-diacetoxy - 12 - ketochol - 9(11) - enate, which with alkali gives a compound which can be reduced by a modified Wolff-Kishner method to the required 3a-hydroxychol-7: 9(11)-

dienie acid.

It is necessary to convert the 7:9(11)-diene system of the molecule so that it contains an 11-ketone function. At least four methods have been proposed for this conversion, and in addition various detailed modifications have been used in practice. The diene is oxidised with perbenzoic acid to the 9a:11a-epoxide, which undergoes hydrolytic rearrangement in acid conditions to the 7:11-dihydroxy-8(9)-ene compound. Oxidation of this with chromic anhydride in acetic acid yields an unsaturated 7:11-diketone, which is then reduced with zine and acetic acid to remove the 8(9)-double bond. The resulting saturated diketone has the correct trans-B/C ring junction, and, upon selective reduction in the 7-position by the modified Wolff-Kishner method, a 3β -ol-11-one is obtained. then necessary to transform the 17-side chain into a form which can be converted into the dihydroxyacetone chain of the cortisone molecule. This is usually the 20ketopregnane derivative, from which the enol acetate is formed. Oxidation with perbenzoic acid follows: by this means the 17a-hydroxy group is introduced, and the necessary 21-hydroxy group is introduced by bromination, followed by hydrolysis. This part of the process is comparatively straight-



A stainless steel still with a glass condenser used first the hydrolysis stage of manufacture.

forward, and gives satisfactory In the oxidation of the 7:9(11)-dienes, several competing transformations are possible, and detailed conditions of reaction are important in obtaining successful vields.

Like other methods for the production of cortisone and derivatives, the ox bile process requires, in the early stages, the working - up of large bulks of material. As already mentioned, to make 1 kg. of cortisone acetate from bile paste over 90 different raw materials are employed, the total weight being over 2 tons.

The process progresses by way of a considerable number of different compounds. In practice, many of these do not need to be isolated. although all steps in the synthesis need to be conducted with a rigorous control of reaction conditions and purity of intermediates. In several stages, the reagents used are expensive, and the residues from reaction are worth recovery. For instance, at one time an oxidation with osmium tetroxide was employed for the introduction of the dihydroxyacetone side-chain; this reagent can be dangerous, and its use is certainly costly. Again, in some cases operations involve the use of valuable solvents, such as dioxan, the recovery of which to a state of adequate purity can be difficult. Thus for a satisfactory and economic plant for production of cortisone and its derivatives a considerable amount of ancillary equipment is desirable.

It is true to say that some of the oxidation stages can introduce a certain hazard to the process unless careful control of temperature is employed. This is particularly true of steps using chromic oxide in some form, e.g. the pyridine chromate complex—which, handled without suitable precaution, has been known to explode in the

laboratory.

Plant and operations

The object of the processes used by Uclaf is to maintain the purity and potency of the steroid materials throughout a long and complex series of operations. product is extremely sensitive to metallic contamination and to oxidation. Therefore stainless steel, glass-lined stoneware and Lithcoted plant is used exclusively. Inert processing atmospheres are provided by the extensive use of

nitrogen which, as mentioned, is available on tap. Nitrogen is also used to blow over materials from one vessel to another, thus avoiding the need for expensive pumps made of inert materials.

Large quantities of cooling brine are used. Where exact temperature control is required over a wide range, jacketed vessels are employed; the jackets are filled with brine which can be heated by means of steam coils inside the jacket. On some processes the vessels used are not jacketed but have brine and steam coils welded to the outside.

Initial oxidations are carried out in 500 litre stainless steel coneshaped vessels fitted with 200 r.p.m. propeller type agitators. vessels are jacketed for steam and water circulation and have internal brine coils. Similar types of vessels are used for epoxidation reactions, but in this case they are of 400 litres capacity and their stirrers run at 700 r.p.m.

After epoxidation the reaction mixture is filtered in Lithcoted vessels fitted with a perforated plate across which is placed a nylon filter cloth. Filtration is carried out by applying vacuum underneath the plate and pulling the filtrate through. Similar equipment is used for recrystallisations.

The next step is an hydrolysis which is done in a large stainless steel vessel equipped with an anchor stirrer. The product is separated

by centrifuging.

Bromination, the next step, is done in open glass-lined vessels, using liquid bromine. Mobile steam coils and stirrers are used and if necessary the mixture is cooled with solid carbon dioxide. This process naturally requires efficient fume extraction, flexible hoses leading into plastic ducts being used. The bromination is initiated by a catalyst, namely hydrogen bromide absorbed into an organic solvent, which is prepared on the spot in a special laboratory.

Then follows esterification in a 150 litre stainless steel vessel fitted with a 44 r.p.m. anchor agitator. The product is purified by reerystallisation, after which comes bromoxidation in a 250-litre glass-lined open vessel. The 900 r.p.m propeller type stirrer is made of solid Fluon and the shaft is sheathed with this highly inert plastic. These precautions emphasise the need to exclude metallic contamination at this stage.

Following bromoxidation the re-



This glass-lined reaction vessel is used in one of the final reactions, namely the protection of certain groups in the steroid molecule.



Using a polarimeter in the control laboratory.

action mixture is precipitated in ice water, filtered in vacuum filter vessels similar to those already described and then purified six times in a variety of vessels, including two 700 litre glass-lined vessels equipped for reflux and fitted with 44 r.p.m. anchor stirrers, two 250 litre and one 75 litre vessels.

it is

lysis

nless

chor

sels.

obile

used

e is

effi-

oses

eing

ited

gen

anic the

n a

ted

tor.

re-

nes

ISS-

m.c

of

ied ese

eed

ion

re-

The next step, dehydrobromination, is done in a glass-lined vessel jacketed for steam and brine and fitted with an anchor stirrer, the reaction proceeding in an atmosphere of nitrogen. The product is again precipitated in large quantities of ice water, filtered in *Lithcoted* vacuum filters and purified by recrystallisation.

The next step is reduction, but before this can be done certain groups in the steroid molecule have to be protected, e.g. by the formation of bisulphate compounds, semi-carbazones, etc. To protect these groups the mixture is processed for 24 hr. under reflux in large glass-lined vessels fitted with steam and brine jackets. Again follows precipitation in ice water and filtration, this time in stoneware Without further vacuum filters. purification the product is reduced in stainless steel vessels fitted with propeller stirrers.

Then follows hydrolysis in 125litre glass-lined vessels fitted with steam and brine jackets. Part of the reaction is done with highspeed stirrers, but as the product thickens appreciably the final stirring is done with 44 r.p.m. anchor stirrers.

The last esterification is done in stainless steel vessels, again steam and brine jacketed and fitted with propeller stirrers working at 450 r.p.m. The final purification is recrystallisation with decolorising charcoal, overnight freezing with brine at-15°C., and filtration of the crystals which are washed with solvent and dried in a vacuum Filtration is done under oven. nylon canopies which can be moved about the factory to suit operations; no filtration of the finished product is done in foggy weather for fear of contamination.

The delta series of cortisone derivatives — prednisone, prednisolone and their acetates - is, of course, manufactured from the same starting materials as cortisone. The manufacturing route diverges at one stage to insert the additional double bond, but the subsequent reactions are basically identical from a chemical engineering standpoint, comprising bromination, cendehydrobromination, trifuging, precipitation, filtration, recrystallisations, hydrolysis, protection of groups, reduction, hydrolysis and purification on the lines already indicated.

The final hydrolysis is an extremely slow reaction and it proceeds for about seven days at low temperature in order to protect the very delicate steroid. A 125-litre glass-lined vessel fitted with a

44 r.p.m. anchor stirrer is used. The vessel is jacketed, carrying brine and steam. The temperature of the brine is kept to within 1°C. by circulating it through a thermostatically-controlled tank containing a brine coil and a heating element. To avoid the need for flameproofing of this particular equipment, it is placed outside the main production hall, the brine being piped in through the brick wall.

The mother liquors from each reaction go to a battery of 2,000 litre liquid-liquid extractors made of stainless steel for the recovery of traces of steroid. The vessels are fitted with stainless steel stirrers and circulating pumps; several are fitted with steam coils. The mother liquors are extracted with a waterimmiscible chlorinated hydrocarbon solvent. The steroid is then recovered by distillation of the separated solvent and is returned to the process at the appropriate stage after purification.

Many raw materials used in the process are too delicate for long storage and so have to be made fresh on the spot in single batches as required. The hydrogen bromide catalyst already mentioned is one example. Another catalyst is manufactured in a small laboratory outside the main production hall. A carefully planned timetable is required to ensure that these sensitive intermediates are available for use at the appropriate stage of the process. However, the main concern is to prevent loss of the valuable steroid at all stages of production and this consideration over-rides all others. Should delays occur it is only possible to store some steroid intermediates for a short time; if it is in solution it must be kept in a vessel cooled to -15° C. and if it is in the wet solid state it must be thoroughly dried and kept in polythene bags in air-tight containers.

The final processing of corticosteroids at Stratford consists of sieving in vibratory machines fitted with nylon brushes; some products are ground down to 3-10 microns in a microniser for special purposes. They are then ready for despatch to the Harrow Road factory for pharmaceutical processing or sale.

Control laboratories

Analytical control of raw materials, intermediates at every stage of processing and finished products is carried out in well-equipped



One of the control laboratories at Stratford. Each worker has his own bench, and there is a full range of equipment for carrying out exhaustive tests on raw materials, intermediates and finished products.

laboratories by the chief analyst and his 10 assistants. No raw material is accepted for the process. until it has passed exhaustive tests in the laboratory. Of equal importance is the analytical control imposed at each stage of manufacture. Speed and accuracy in the control laboratories are vital to the efficiency of the whole factory. Each worker has his own bench and, so far as possible, each specialises in particular analyses. Equipment is provided for a wide range of inorganic, organic and physicochemical tests and includes polarimeter, ultra-violet spectrophotopH meters, balances, chromatographic apparatus, and a microscope for particle size deterbesides the mination, usual equipment.

> Some suppliers of plant to Uclaf, Stratford

Glass-lined vats and reaction vessels: Cannon (CP) Ltd.

Enamelled Metal Products Corporation (1933) Ltd.

Stainless steel equipment and apparatus: Stainless Steel Vessels (London) Ltd.

Moritz Chemical Engineering Co. Ltd. Drying ovens (ventilated): L. A. Mitchell Ltd.

Microniser:

F. W. Berk and Co. Ltd.

Fume absorption tower and filters, porous (porcelain candles):

Doulton Industrial Porcelain Ltd. Air filters for compressed air (Micronising plant):

Aerox Ltd. Vokes Ltd.

Filter cloths: S. H. Johnson and Co. Ltd. Filters (vacuum):

T. Giusti and Son Ltd. Stainless Steel Vessels Ltd. Hathernware Ltd. Doulton Industrial Porcelain Ltd.

Glassware:

Q.V.F. Ltd. Protective clothing and safety equipment: Siebe Gorman Keeling and Walker Ltd.

Fire extinguishers: Pyrene Co. Ltd.

Vacuum pumps: Edwards High Vacuum Ltd.

Worthington-Simpson Ltd. L. A. Mitchell Ltd. Girdlestone Pumps Ltd.

Demineralised water plant: Permutit Co. Ltd.

Steel and Cowlishaw Ltd.

Grinding mills:

Fyna Industries Ltd. Forplex

Isomantles:

Isopad Ltd.

Stainless steel vessels, stills, extractors, etc.:

T. Giusti and Son Ltd. John Dore and Co. Ltd.

Stainless Steel Vessels (London) Ltd.

Fire protection. Technical Information Sheet 4005, Partitions and Internal Linings, is a general review, from the fire protection point of view, of building boards and methods of installing them.

Technical Information Sheet 4006, Roof Construction, suggests practicable and economical means by which a degree of fire resistance can be included among the properties normally required in roofs.

Copies of both sheets can be obtained free on application to the Fire Protection Association at 15 Queen Street, London, E.C.4.

Crystal Sieves for Separating Molecular Mixtures

At a meeting of the Fine Chemicals Group of the S.C.I. in London, Prof. R. M. Barrer, F.R.S., lectured on "Separation of Mole-cular Mixtures using Crystal Sieves."

He described work at his laboratories at Imperial College, University of London, on discovering, characterising, operating and modifying molecular sieve crystals. The structure and nature of the crystals were discussed and illustrated, and a number of them were then classified on the basis of the shape and size of those types of molecule which are sorbed within the crystal and those which are not. On this basis one may predict which mixtures will be separable by a particular sieve sorbent. Ways of veripredictions these illustrated, some showing the separation of straight from branched chain molecules, n-paraffins from aromatics and naphthenes, drying of gases and of liquids such as alcohols and other solvents, separations of simple permanent gases, and uses of sieves to purify slightly contaminated molecular species.

Apart from the classification of four major groups of molecular sieves it was shown that a great multiplication of the range of available sieves is possible:

(1) by use of strongly sorbed modifier molecules in rather small quantities, which are anchored in the intracrystalline channels and act as barriers to entry of other less strongly sorbed species. These barriers impeded selectively pairs of molecules by different size and

(2) by replacing smaller cations in the zeolites by larger ones, and vice versa. Again the cations can act as selective barriers, and can bring about radical alterations in sieve action;

(3) by changing the valence of the cations in the zeolites one may change their number. Thus exchange of 2Na by Ca can also greatly alter the sieve characteristics of a given zeolite:

(4) by synthesis one may prepare series of zeolite sieves based on given structural frameworks in which the Al₂O₃: SiO₂ ratio is This is equivalent to changed.

(Continued on page 112)

Treatment of Glue and Gelatine with Formaldehyde

By A. M. Kragh, B.Sc.*

The effect of certain variables on the reaction of formaldehyde with animal glue and gelatine is described and the application of these to the industrial use of formaldehyde discussed.

ALTHOUGH formaldehyde is probably the most widely used of reactive materials added to animal glue and gelatine, its action is very difficult to control and is little understood. One reason for this is the variety of chemical changes that may occur. Formaldehyde has been postulated to react with virtually every polar protein side-chain group as well as with the peptide linkage.\(^1\) The main reaction, however, is a reversible one involving one or two molecules of formaldehyde and an amino group:

es

ine

.S.,

oles."

ra-

er-

ng,

di-

he

als

nd

sind

ıle

tal

is

X-

ri-

re

p-

ed

m

ng

as

y

of

it

of

11

RNH₂+ HCHO= RNHCH₂OH RNHCH₂OH+ HCHO= RN(CH₂OH)₂

This is the reaction used in the well-known formaldehyde titration of proteins to estimate amino groups.2 It can be reversed by washing with water or dilute acids. A slower, largely irreversible, reaction may follow with the elimination of water and formation of a methylene bridge between gelatine molecules. These links may form between a variety of groups. It is reported that they are most commonly formed by condensation between an aminomethylol group in one molecule and an amide or guanidine group in another.3 This reaction is the important feature in the formaldehyde tanning of collagen, 4 and the insolubilisation of gelatine and glue.

Owing to the difficulties of controlling and stopping the reaction, formaldehyde is normally used with glue and gelatine only when it is desired to produce complete insolubility. The reaction however is best studied in solution, where the formation of cross-links is indicated at first by increases in solution viscosity, and finally by gelling of the solution.

Experiments and results

In order to determine the importance of certain variables on the reaction of formaldehyde with

* Principal Research Officer, British Gelatine and Glue Research Association. glue and gelatine, formaldehyde was mixed with solutions of different grades of glue and gelatine under a variety of conditions, and the changes in viscosity with time observed. The results are summarised and discussed below.

Since formaldehyde reacts with the amino groups of gelatine, the pH falls steadily as the reaction proceeds. The reaction may be slow or rapid depending on the experimental conditions. The rate of the cross-linking reaction is increased by the following factors:

Increase in gelatine or glue concentration,

Increase in formaldehyde concentration.

Increase in temperature, Increase in pH.

Although the molecular weight of the gelatine probably does not affect the reaction rate, the viscosity is increased more rapidly when the molecular weight is high.

These factors are considered separately below.

Gelatine or glue concentration. Molecules can more readily be linked when they lie close together and hence cross-linking reactions are best carried out in concentrated solution. This also minimises the formation of links between different parts of the same molecule, which may occur to an appreciable extent in dilute solution. For practical purposes the upper limit of concentration depends on considerations of viscosity and stirring. Glues of low molecular weight can therefore be cross-linked in much more concentrated solution than high molecular weight gelatines.

Formaldehyde concentration. Concentrated formaldehyde solution reacts very rapidly with glue and gelatine. It is normally necessary to dilute it considerably in order to avoid a rapid local reaction, with the formation of an insoluble gel, before the formaldehyde has been evenly distributed. A suitable procedure is to make up

the gelatine or glue solution at double the required concentration and mix equal volumes of gelatine solution and dilute formaldehyde solution.

Increase in temperature. rate of reaction increases with temperature in the normal manner, except that if solutions are cooled and allowed to gel after addition of the formaldehyde, the reaction then continues more rapidly than would be expected from the rate in solu-Where the reaction takes place in the gel state, it leads to an increase in the jelly strength, whereas moderate formaldehyde treatment in solution does not greatly affect subsequent jelly strength. At high temperatures the cross-links are broken by thermal degradation and hence the reaction is best carried out between 40° and 60°C.

Increase in pH. At pH 4, formaldehyde reacts only slowly with glue and gelatine, except when the concentration of formaldehyde is The viscosity of a very high. solution at this pH containing formaldehyde rises very slowly over a number of hours. At pH 9 reaction is almost instantaneous and difficulty may be experienced in mixing the reactants. After the initial rapid reaction which lowers the pH, the reaction slows down. The rate of reaction is intermediate at intermediate pH values.

Although reaction is very rapid at pH 9, it is necessary to keep the pH at this value for 2 or 3 hr. if the effects are to be permanent. Immediate lowering of the pH leads to a reversal of the cross-linking reaction. This reaction presumably takes place in two stages, the first of which, although rapid when the pH is high, is reversible on lowering the pH.

Molecular weight of glue or gelatine. Materials of high molecular weight (that is those that form the most viscous solutions at a standard concentration) can be cross-linked more readily than materials of low

molecular weight. Less formaldehyde is required to increase the viscosity by a given factor, and the reaction can be carried out at a lower concentration. For example, under suitable pH conditions, about 0.2% formaldehyde (on the weight of gelatine) will convert a 7% solution of a high grade gelatine into a gel. About three times this quantity would be required to obtain the same effect with a 15% solution of an average bone glue, and considerably more with a 7% solution.

Conditions of use of formaldehyde

One of the main disadvantages of formaldehyde as a cross-linking reagent is that the reaction cannot be satisfactorily stopped when the desired degree of cross-linking has occurred. After gelatine which has been treated with formaldehyde has been dried, reaction may continue over a period of months in the dry state until the material becomes insoluble. For this reason glue and gelatine have normally been treated with formaldehyde when an insoluble product has been required. Formaldehyde may however also be used to obtain effects in solution when it is not important if the product eventually becomes insoluble on drying.

In the manufacture of abrasive paper, the glue used to coat the paper on which the abrasive particles are to be stuck could be increased in viscosity by adding formaldehyde. It would not be disadvantageous if the dried glue film became insoluble. In uses of this type the most suitable method is to add the formaldehyde in a very dilute solution to the glue at a temperature of about 50 °C. and at a pH of 7-9. The higher the pH the better, but at a pH of 9, very good stirring is required owing to the speed of the reaction. If, after standing for 2-3 hrs., the pH is lowered to about 4, there will be little further reaction within the next few hours, so that a stable viscosity is obtained.

The careful control required in such uses of formaldehyde makes its use unpopular, and it is much more commonly used when it is required to raise the melting-point of a jelly or to render a dried film of glue or gelatine insoluble. When treatment takes place in the gel state, some control over the experimental conditions is still required. For example plasticised

gelatine capsules may be "hardened" by dipping them into formaldehyde solution or treating them with formaldehyde vapour. The disadvantages of the slow reaction of formaldehyde still apply, and the capsules may become unduly brittle after a period of months. difficulty may to some extent be overcome by having the gelatine at a high pH, using less formaldehyde, and finally treating the capsules with acid to lower the pH of the gelatine again. If however the pH is too high, there is a danger of obtaining an insoluble skin on the outside of the capsules, leaving untreated gelatine inside, since the formaldehyde may react fully before

it has had time to penetrate far.

Where dried films of gelatine or glue are treated with formaldehyde as in the manufacture of paintbrush handles with a gelatine "varnish," much less control is required, since the film of gelatine can be treated with a large excess of formaldehyde to render it hard and completely insoluble.

REFERENCES

- 1. F. W. Putnam, "The Proteins," 1953,
- 1, 931. Academic Press, New York. 2. "Advances in Protein Chemistry." 1945, 2, 278.
- 3. H. Fraenkel-Conrat and H. S. Olcott, J. Biol. Chem., 1948, 174, 827.
- 4. "Advances in Protein Chemistry," 1949, 5, 354.

A film about ergot





"Ergot-The Story of a Parasitic Fungus," is the name of a new colour film produced by Burroughs Wellcome Ltd. A comprehensive review of the history and natural history of ergot, this film contrasts the poisonous and medicinal properties of the fungus. The life cycle is presented in detail for the first time, and leads to the showing of the commercial handling of ergot in Portugal and a description of artificial methods of ergot propagation in

The manufacturing methods which lead to the extraction of the alkaloids are revealed. The climax of the film is a showing of Ergometrine in use at the Obstetric Unit of University College Hospital, London. This film received the active co-operation of Sir Henry Dale and Professor Chassar Moir, who appears in the film to describe the discovery of Ergometrine in 1935.

Photographs: Left. Sclerotia of claviceps purpurea (ergot) germinate on the ground. These liberate ascospores which settle on the rye flower and infect the ovary. Right. Laboratory technicians carry out

the short-circuiting of the life cycle of claviceps purpurea (ergot). Here they are removing conidiospores from a mycelium grown under sterile conditions in Thompson bottles.

Isceon (pronounced Ice-on) is the trade name given by Imperial Smelting Corporation to a range of fluoro-halo derivatives of aliphatic hydrocarbons used as refrigerants, propellants, fire extinguishing agents, and as inter-mediates for the synthesis of other fluorine chemicals and plastics. A handsomely printed and bound book outlines the development of a new process, the continuous vapour phase process, which was evolved for making Isceon 122 and Isceon 131 leading to the erection of a full-scale plant at the Company's Avonmouth works which started operating at the beginning of 1957. There is also information on the physical, chemical and thermodynamic properties of these chemicals, as well as brief notes on other Isceon products under development.

NONIONIC SURFACE ACTIVE AGENTS

By Leon Raphael, M.SC., F.R.I.C.

1. Chemistry and Manufacture

One of the most important products of the expanding petroleum chemicals industry is ethylene oxide. Most is converted to ethylene glycol for engine antifreeze, but a good proportion is used to make nonionic surface active agents which have aroused interest since their introduction in Germany about 1930. Their entry into the detergent market was largely due to the shortage of natural fats and other raw materials, but their inherent merits were soon recognised. In this first part of a comprehensive article on nonionics, Mr. Raphael discusses their chemistry and manufacture, dealing inter alia with cloud point, foam and wetting. In the second part he will deal with their industrial applications.

THE term "detergent" is often applied indiscriminately to all surface active agents, although strictly speaking it should be confined to certain surface active agents which perform a cleansing operation. A surface active agent is defined as a substance which lowers the interfacial tension between two normally immiscible phases such as liquid and gas; liquid and liquid; liquid and solid; producing a foam, emul-sion or dispersion. Surface active agents may assist wetting out of textiles, flotation of ores or dispersion of pigments. This behaviour of surface active agents is due to the fact that their molecules contain two opposing groups; a hydrophilic (or lipophobic) group, which is water-soluble, oil-insoluble, and a hydrophobic (or lipophilic) group, which is water-insoluble, oil-soluble. The relative strengths of these opposing groups may produce a completely balanced product or one with predominantly hydrophilic or hydrophobic character. When the hydrophilic properties take precedence, the product is water-soluble. In dilute aqueous solution the molecules of surface active agent concentrate at the water-air or water-oil interface, the hydrophobic groups trying to escape to the non-aqueous phase in contact with the solution, while the hydrophilic groups are attracted towards the bulk of the solution. This results in a lowering of the surface or interfacial tension, which continues to fall as the concentration of surface active agent increases, until a certain critical concentration is reached, beyond which

far.

ine or ehyde brush

nish," since

eated chyde letely

1953,

York.

stry,"

leott.

stry,"

ım

in

he

ıg

lo

ıs

er

g

no further reduction of surface tension occurs.

The term surface tension is used when the non-aqueous phase is in contact with a gas, while interfacial tension is used when the nonaqueous phase is another liquid. At the critical concentration, the molecules of surface active agent have completely filled the interface with one or more layers and begin to coalesce in the bulk of the solution to form "micelles." hydrophobic groups collect together with their heads at the centres of the "micelle" spheres, to escape the aqueous medium and the hydrophilic groups point outwards into the solution. When an oil phase is mixed with an aqueous solution of surface active agent, the oil drop-lets are held by the "micelles", so producing a solubilisation of the oil in water. At higher concentrations of the oil phase, an emulsion is produced. When a predominantly hydrophobic surface active agent is dissolved in an oil or other nonaqueous medium, a water-in-oil emulsion is produced by the reverse process. The stability of such emulsions is dependent on the affinity of the disperse phase for the particular group at the centre of the "micelle" sphere.

The classical example of a surface active agent is soap, a name usually applied to the sodium or potassium salts of long chain fatty acids. In aqueous solution, soaps ionise to a certain extent, the "active" part of the molecule carrying a negative charge.

 $C_{17}H_{35}COONa \rightleftharpoons C_{17}H_{35}COO^- + Na^+$

The long-chain fatty group is hydrophobic and the carboxyl (COO-) group is hydrophilic. Nansa H.S., a sodium alkyl aryl sulphonate, and Teepol, a sodium alcohol sulphate, behave similarly in aqueous solution, the sulphonate or sulphate group being the hydrophilic portion of the molecule. These products are anionic surface active agents. The Arquads—quaternary ammonium derivatives, are examples of cationic surface active agents, as the active part of the molecule carries a positive charge.

Nonionic surface active agents, as their name implies, do not ionise in solution and may be mixed with either anionics or cationics to mutual advantage. Anionics and cationics cannot be formulated together as they form inactive precipitates when mixed in solution. Commercially available nonionics are of two types:

- a. Long-chain fatty acid esters derived from ethylene oxide or polyhydric alcohols such as glycols, polyglycols, glycerol, sorbitol or sucrose.
- b. Ethers of long-chain fatty alcohols, alkylated phenols or

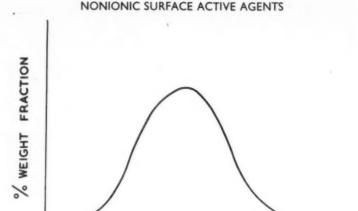
mercaptans prepared by direct reaction with ethylene oxide. The ethylene oxide or polyhydric alcohol is the hydrophilic portion of the molecule.

As with soap and other surface active materials, the hydrophobic group generally contains 11 to 18 carbon atoms as this range is known to be most suitable. The hydrophobic character increases with increasing carbon chain length and exhibits different properties with the same hydrophilic group. A 12 carbon chain group, e.g. lauryl, has the greatest water solubility and highest foaming power. The stearyl group with 18 carbon atoms is much less soluble, has poor foaming properties, but is a good emulsifier and detergent. Soaps contain a mixture of fatty acid salts within the range mentioned, so giving optimum values of foam and detergency.

Reaction with ethylene oxide

The reaction of fatty alcohols or alkyl phenols with ethylene oxide takes place readily at atmospheric pressure at 140°-180°C. in the presence of an alkali catalyst. The reaction follows the scheme—

The ethylene oxide chain continues to increase to any desired length as long as ethylene oxide is fed into the system, so that an infinite number of variations is possible for any one hydrophobic group. Fatty acids react more slowly with ethylene oxide1 to produce esters and the application of pressure is often desirable. On a commercial scale, pressure is often recommended for all ethylene oxide reactions, resulting in better coloured products and a short reaction time. In all cases, there is a short induction period before the reaction sets in. Once all the hydrophobic molecules have each reacted with one molecule or ethylene oxide, the further reaction of the ether with more ethylene oxide becomes random. At any stage of the reaction there will be present



ETHYLENE OXIDE CONTENT.

FIG. I.

polyglycol ethers with different proportions of ethylene oxide, and a statistical analysis of any one product will be represented by a Poisson distribution curve of the type shown in Fig. 1.2 The peak of the curve corresponds to the average ethylene oxide content and the amount of product having such composition is usually 15 to 20% of the total. The shape of the curve will vary with different reaction conditions; a higher temperature widens the distribution and lowers the peak. It will be shown later that different distribution for the same average ethylene oxide content may produce different properties.

Ethylene glycol reacts with ethylene oxide to produce polyethylene glycols. Commercially, these products are designated by their average molecular weight. The polyglycols may be reacted with fatty acids to produce polyglycol esters. This alternative route to direct ethoxylation is useful for the small scale manufacturer who may have difficulty in handling ethylene oxide. Polyglycol esters, produced in this way, contain some unreacted acid which is advantageous, as emulsi-

fiers are found to function more efficiently when some free fatty acid or fatty alcohol is present. The free acid is readily solubilised by the polyglycol esters.

When propylene oxide is reacted with propylene glycol, polypropylene glycols are produced. At molecular weights above 800, polypropylene glycols are water-insoluble and may be used as the hydrophobic base for reaction with ethylene oxide to produce surface active agents.3 A variety of products can be obtained and are known commercially as Pluronics, and more recently Tetronics have been described. Tetronics are prepared by reacting propylene oxide with ethylene diamine producing four available groups for reaction with ethylene oxide. The structure of these products is of the type shown in Fig. 2.

Glycerol esters are generally used in cosmetic formulations and are examples of predominantly hydrophobic emulsifiers. The glycerol molecule is not sufficiently large to balance the long fatty chain and diesters will be even more hydrophobic than monoesters. The ethylene oxide derivatives have the

$$\begin{split} &H(C_{1}H_{4}O)_{x}-(C_{3}H_{6}O)_{z}-(C_{2}H_{4}O)_{y}H\\ &H(C_{2}H_{4}O)_{a}(C_{3}H_{6}O)_{k}\\ &H(C_{2}H_{4}O)_{b}(C_{3}H_{6}O)_{l}\\ &NCH_{z}-CH_{z}N(C_{2}H_{6}O)_{m}(C_{2}H_{4}O)_{c}H\\ &(C_{2}H_{6}O)_{n}(C_{3}H_{6}O)_{l}\\ \end{split}$$
 Fig. 2. Structure of products typified by the Pluronics and Tetronics

a vantage that the hydrophilic goup can be varied at will to be ance a given hydrophobic group.

Sorbitol is more hydrophilic than giveerol and its fatty acid esters known as Spans, are used as emulsifiers in a variety of products, including foods, as they are non-toxic. Spans are predominantly hydrophobic, but the free hydroxyl groups of the sorbitol may undergo reaction with ethylene oxide to produce hydrophilic emulsifiers known as Tweens. To produce an emulsion, the most effective surface active agent is one which can provide the correct hydrophilic-lipophilie (hydrophobie) balance (abbreviated to HLB) between the two phases. A mixture of emulsifiers is frequently necessary and suitable mixtures of Spans and Tweens have been worked out to suit a wide range of formulæ. The Span is dissolved in the oil phase and the Tween in the aqueous phase. In each case the surface active agent will concentrate at the interface of its solution, and when the two solutions are mixed a double boundary layer is produced, facilitating the intermingling of the two phases by forming complex "micelles."

Returning to the Poisson distribution in ethylene oxide derivatives, it is generally found that a product with wide distribution has better emulsifying properties than one with a narrow distribution. A mixture of two nonionics of different ethylene oxide content will achieve the same result, having a wider distribution than a single product of the same average ethyl-

ene oxide content.4

ore

tty

nt.

sed

ed

vl-

le-

-0

ole

0-

71-

ve

an

n-

re

e-

y İ-

e

1

The amount of ethylene oxide required to produce a nonionic with particular properties will depend on the nature and length of the hydrophobic group. As ethylene oxide is condensed on to the alkyl phenol or fatty alcohol, the product becomes gradually more soluble. Octyl phenol, when condensed with 5 moles ethylene oxide, becomes water-dispersible. With about 8 moles ethylene oxide, the product is water-soluble at room temperature, producing very viscous solutions. With more ethylene oxide, water solubility increases further. The proportion of ethylene oxide required to produce a water-soluble product will also depend on the distribution and will be discussed

Lauryl alcohol, with 12 carbon atoms, forms a water-soluble con-

densate with about 6 moles ethylene oxide, but stearyl alcohol (18 carbon atoms) requires 9 moles ethylene oxide. Oleyl alcohol has the same carbon chain length as stearyl alcohol, but, being unsaturated, is slightly less hydrophobic and forms a water-soluble condensate with 8 moles ethylene oxide. In a completely balanced water-soluble nonionic the lengths of the hydrophilic and hydrophobic groups are approximately equal. For this reason, sorbitol is not sufficiently hydrophilic to balance the large fatty acid grouping, but sucrose, which is about twice the molecular size of sorbitol, is sufficiently hydrophilic to form water-soluble esters with stearic acid. The sucrose esters have recently come into prominence as hydrophilic emulsifiers and have the advantage of being completely non-toxic. The polyethylene glycol esters are still suspected of being toxic and are therefore not recommended for use in edible products. The danger of toxicity will also apply to the Tweens.

In practice, most non-ionics contain between 5 and 30 moles ethylene oxide per mole hydrophobic group, although certain special emulsifiers may fall outside this range. Emulphor EL is a condensate of castor oil with 40 moles ethylene oxide. The products which contain a small proportion of ethylene oxide are water-dispersible and oil-soluble. Such products are good water-in-oil emulsifiers, e.g. Lubrol MOA. When balanced, to be just water-soluble, e.g. Lissapol N, they are good wetting agents and detergents. With an excess of ethylene oxide, making them predominantly hydrophilic, they are good oil-inwater emulsifiers. An example of this type is Lubrol W, which is a fatty alcohol condensate with about 18 moles ethylene oxide. A long chain fatty alcohol with more than 20 moles ethylene oxide is a good dispersing agent for pigments in aqueous media, and with 30 moles ethylene oxide the product is so hydrophilic that it is an emulsion

Brief mention should be made of the alkylolamides. These products are condensates of ethanolamines with fatty acids, e.g. Ethylan LD or of ethylene oxide with fatty amines—Ethomeens. A complete account of these products appeared some months ago in this journal.⁵ The Ethylan type of condensate

may be further reacted with ethylene oxide to produce a more hydrophilic product, e.g. Empilan LP2.

During the second World War the Germans became short of ethylene oxide, and after condensing 2 or 3 moles ethylene oxide on to a hydrophobic group they then sulphated and produced an anionic with excellent detergent and foaming properties. Triton X770 is a sulphated alkyl phenol condensate and Empicol SLE is a sulphated lauryl alcohol condensate.

As ethylene oxide is condensed on to a hydrophobic group, the physical nature of the product changes. At first the melting-point drops and continues to fall until near the balance-point, where hydrophobic and hydrophilic groups are about equal. Further increase of ethylene oxide content raises the melting-point from highly viscous liquids, through pastes, and finally to hard waxes when the products are very strongly hydrophilic. These differences can be observed in Lubrol MOA and Lubrol W, the former being a viscous liquid, the latter a wax. At the balance point, where a condensate becomes watersoluble, its aqueous solutions are highly viscous and at high concentrations (about 30%) they form gels. As the ethylene oxide content is increased, the viscosity of aqueous solutions at equivalent concentrations falls very sharply. Octyl cresol with 8 moles ethylene oxide at 20% concentration in water has a viscosity of 25°C. of over 100 cs.; with 10 moles ethylene oxide at the same concentration, the viscosity falls to 24 cs. As the molecular weight increases further, the viscosity rises again.6

This fact is important for the formulation of liquid detergents. The solution should not be too viscous, but at the same time very much more viscous than water, otherwise it is difficult to convince the public of the high concentration

of active detergent!

Cloud-point

One of the distinguishing features about nonionics is their inverse solubility at high temperature. Octyl phenol with 8 moles of ethylene oxide is just water-soluble at room temperature. On heating, the solution suddenly becomes cloudy at a specific temperature—the "cloud-point." The "cloud-point" is independent of concentration in the range of 0.1 to 10%.

At concentrations below 0.1%, the cloud-point rises with decreasing concentration and above 10% the cloud-point rises, less steeply, with increasing concentration. Usually, cloud-points are measured in the region of about 0.5% concentration.

As the ethylene oxide content is increased, the cloud-point rises and a graph of ethylene oxide content versus cloud-point is linear.6 The products with very long ethylene oxide chains have cloud-points above 100°C., but these may be measured by heating the solution under pressure. Mention was made earlier of the formation of "micelles" beyond a certain critical concentration. The hydrophilic ethylene oxide chains which point towards the bulk of the sphere are hydrated, the water molecules attaching themselves to the oxygen atoms. This hydration "dissolves" the "micelles" in water. As the temperature is raised, the hydration bonds are broken and the surface active agent separates from the aqueous phase. In fact, when a high concentration of nonionic is heated above its cloud-point and allowed to cool, two separate layers are observed. The upper layer is a solution of water in the nonionic and the lower layer a solution of the nonionic in water. Mixing these two layers below the cloudpoint reproduces a clear solution. The cloud-point of a particular nonionic is dependent on the Poisson distribution.4 If the distribution is wide, a higher proportion of low molecular weight products will be present and will come out of solution at a lower temperature. A narrower distribution means the absence of these low polymers and the product will be more hydrophilic and have a higher cloud-point. The longer the ethylene oxide chain length, the greater the degree of hydration and the higher the temperature required to "de-solvate" the nonionic molecules. A mixture of two nonionics of the same hydrophobic group, with different ethylene oxide contents, will have a cloud-point intermediate between the values of the two products, but lower than that of a single nonionic of corresponding average ethylene oxide content. The higher molecular weight products will to some extent solubilise the lower polymers. The addition of inorganic salts lowers the cloud-point of solutions of nonionics.

Foam

One of the criticisms levelled against nonionies is their poor foaming characteristics. The fatty acid and fatty alcohol condensates of ethylene oxide have very poor foaming power, but as their principal use is as emulsifying agents, it is unimportant. The alkyl phenol condensates are chiefly used in liquid detergent formulations and have moderate foaming power. Unfortunately the foam is rapidly destroyed in hard water, but this does not affect their performance as they have excellent lime-soap dispersion values. The foaming power of water-soluble nonionics independent of the ethylene oxide content at any given temperature. Above the cloud-point, the foam-height falls rapidly, due to the separation of the two phases. The rate at which foam height falls with temperature has been used to observe the distribution of molecular weight in a nonionic surface active agent.7 It is still not certain whether foam plays any active part in detergency or wetting operations. It is certainly a powerful selling point and one of the best known liquid detergents sold on the British market, based on a nonionic,

Industry Fights Corrosion

The full "Proceedings" of the Corrosion Convention, held in London last October, is now available. Organised by Corrosion Technology, the Convention was attended by over 500 delegates from the U.K., Europe and America. Thirteen papers dealing with different aspects of the corrosion problem were delivered and discussed over two days, subjects covered including corrosion in the shipping, petroleum, atomic energy and chemical industries; metals, paints and plastics were Other subjects indiscussed. cluded packaging, water treatment, cathodic protection, fuel additives, hot galvanising and the protection of buried pipes.

The "Proceedings" contains over 100 large pages and gives the full texts of all papers delivered, together with reports of the ensuing discussions. The volume is illustrated and bound in stiff paper. It costs 21s., post free, from Corrosion Technology, Leonard Hill House, Eden Street, London,

N.W.I.

now includes a foam booster. In dish-washing detergents, foam stability is used as a measure of efficiency of the product. If the foam is rapidly destroyed by the the soil, then the product is useless. In fact, the usual test method is to observe the number of plates washed before the foam disappears.

Good surface tension lowering of water is exhibited by the watersoluble alkyl phenol ethers such as Lissapol NX and Triton X-100. Wetting action is related to surface tension in the following way. Pockets of air on the surface of a solid, such as textile fibres or mineral ores, hinder the penetration of water. By lowering the surface tension of the aqueous solution, these air pockets are removed, the fabric or mineral sinks allowing complete wetting. The alkyl phenol ethers are extremely good wetting agents at all temperatures below their cloud-points. The fatty alcohol and fatty acid derivatives of ethylene oxide are poor wetting agents and do not lower the surface tension of water to the same extent as the alkyl phenol ethers. For a series of water-soluble ethers of the same hydrophobic group, the surface tension lowering effect is greater, the shorter the ethylene oxide chain. The surface tension of a solution falls with rise of temperature, but beyond the cloud-point the nonionic will have no effect as it comes out of solution. The greatest lowering of surface tension will be effected just below the cloud-point for any particular nonionic. Although anionics are good foamers in hard or soft water, their surface tension lowering and wetting effects are considerably reduced in hard water. Nonionics are equally good in hard or soft water in lowering surface tension and in wetting properties, although as mentioned above their foam is rapidly destroyed in hard water.

REFERENCES

- 1. Wrigley, Smith and Stirton, J. Amer.
- Vingley, Sinda and Satron, J. Amer. Oit Chem. Soc., 1957, 34, (1), 39.
 Flory, J.A.C.S., 1940, 62, 1561.
 Vaughn, Jackson and Lunsted, J. Amer. Oil Chem. Soc., 1952, 29, (6), 240.
- Stanton, Soap, 1957, 33, (6), 47.
 Mayhew and Hyatt, J. Amer. Oil Chem. Soc., 1952, 29, (9), 357.
 Dutton and Reinisch, Manufacturang Chemist, 1957, (3), 124, (4), 176.
 Raphael, Proc. 1er Cong. Mond. Determination of the control of the contr
- gence, 1954, 1, (1), 52.
- 7. Fineman, Brown and Myers, J. Phys. Chem., 1952, 56, 963.

Scotland's New £3 million Fertiliser Works

of

is

A new factory for manufacturing Concentrated Complete Fertiliser has been built on a 19-acre site at Leith by Scottish Agricultural Industries Ltd. Production commenced last summer, but certain facilities are still under construction. When completed the whole project will represent an investment of more than £3 million and as such is the biggest single operation in S.A.I.'s history.



WHEN attention was being given to the problems of reorganisation of S.A.I.'s long established fertiliser works at Leith, near Edinburgh, a careful assessment of the whole future fertiliser position in Scotland showed that something more than modernisation of this works was required. In short, the time had come to change from the traditional types of superphosphate-based compound fertilisers to more concentrated products which would be easier and cheaper to transport and store and handle. After a study of the various methods by which greater concentration could be attained, the conclusion was reached that a product based on ammonium phosphate would provide the farmer with compounds of nitrogen, phosphorus and potash in the cheapest and most effective form. So it was decided to erect a large works to make C.C.F, (Concentrated Complete Fertiliser), to be marketed in several grades. The outstanding success of the similar product manufactured by Imperial Chemical Industries Ltd. amply demonstrates the favour with which this type of material is received. To those who have had the advantage of using C.C.F. in the past, the economies of handling and saving in storage space

are well known and highly prized.

The next problem which had to be faced was how best to accomplish this major development, and in particular to find a site suitable for it. After a careful search in various parts of Scotland, the final choice fell in favour of a leasehold area of 19 acres which the Leith Dock Commission were reclaiming from the Firth of Forth immediately outside their dock sea wall. The site gives scope for considerable development beyond that at present in It is particularly suited to fertiliser manufacture because of its ready access to a deep-water berth through which the raw materials, most of which have to be imported from overseas, are received. Also, it is well placed for the dispatch of the finished products by ship, either coastwise or overseas.

Raw materials handling

The Leith Dock Commission are replacing the old cranes at the deep-water berth by modern high-speed grabbing cranes. From this point the incoming materials, comprising phosphate rock, sulphur, muriate of potash and sulphate of ammonia, are handled by a 1,470 ft. long belt conveyor system at a rate of 350 tons per

hr. The first conveyor is located in a tunnel alongside the unloading berth and it connects to a series of conveyors housed in enclosed gantries which pass overhead to the main storage building. In addition to this means of economical handling of sea-borne materials, there is also provided a wagon tippler system for discharge of rail wagons at an equivalent rate.

From the conveying system, raw materials are discharged through ports in the roof of the storage building. They are then taken as required to handling plants connecting to each process operation.

The storage building is the most prominent feature of the site, for it is 900 ft. long by 100 ft. wide and stands 60 ft. high to the top of the conveyor gantry, which runs practically the entire length of the building. The roof structure in pre-cast concrete arches clad in asbestos sheeting results in the provision of economic covered storage for some 56,000 tons in all of a number of raw materials in bulk.

Processing

The manufacturing process for C.C.F. is divided into three main stages. The first is the production of sulphuric acid, and this in turn

is used in the second stage to make phosphoric acid. In the third stage, the phosphoric acid is neutralised and compounded with other materials to obtain C.C.F. in granular form.

The first unit to be brought into operation was the sulphuric acid plant. This unit, which is the largest of its kind in Scotland, came into operation in July 1956. It is a sulphur-burning Monsanto contact plant, designed and constructed by Simon-Carves Ltd., and has a capacity of 175 tons of acid per day. This plant is complete with steam recovery from waste heat, by which the normal steam requirement of the whole works is met. Three oil-fired vertical Cochran boilers, located in a boiler house within the sulphuric acid plant area, are provided

for standby. The next stage in the process is the manufacture of phosphoric acid using sulphuric acid and phosphate rock as raw materials. The reinforced concrete framed building. for this plant is located opposite the section of the main storage building in which phosphate is Two air-swept Bradley Poitte mills are provided for phosphate grinding. The phosphoric acid plant was designed by Engineering and Industrial Corporation S.A. of Luxembourg for the production of acid at a strength of 32% P₂O₅. The main reaction vessels, which are of rubber-lined steel with an inner facing of carbon brick, stand on the ground floor. An eighteen-cell Prayon filter, which removes by-product gypsum from the magma resulting from the chemical reaction of sulphuric acid and phosphate rock, is mounted on an upper floor. This plant on an upper floor. embodies the latest views on the manufacture of phosphoric acid for fertiliser purposes and was chosen as a result of a very careful examination of plants in many different countries in Europe and in America.

The last stage is the neutralising of phosphoric acid by ammonia gas to form ammonium phosphate, and the processing of this material with sulphate of ammonia and muriate of potash to produce the final product— a concentrated complete fertiliser in granular form. In the selection of a plant for this operation, special attention was paid to the need to retain the good physical properties of S.A.I. com-

pound fertilisers in recent years, these being renowned for their nonsetting characteristics and closely graded size-range. The compounding and granulating plant, which was designed by Dorr-Oliver Inc. of Stamford, Connecticut, and engineered by Simon-Carves Ltd., stands in a steel-framed building adjacent to the section of the main store in which sulphate of ammonia and potash are housed. The phosphoric acid is first concentrated to a strength which varies with the particular composition of the product being manufactured. The ammonia gas is derived by distillation of either synthetic ammonia liquor or by - product ammonia liquor in a plant installed by Coppee Co. Ltd. The use in this manner of ammonia recovered as a by-product from the carbonisation of coal in coke ovens and gas works is a real contribution to the recovery of this valuable source of plant food. In recent years much of this material has been run to waste for lack of economic means of recovering it in marketable form. The various raw materials, solid, liquid and gaseous, are carefully metered so as to ensure that the composition of the finished product complies The comwith the guarantee. pounding process involves neutralising, mixing and granulating, followed by drying and sizing of In this series of the product. operations the largest single unit is the drier, which takes the form of a rotary tube 90 ft. long by 11 ft. diameter, driven by a 280 h.p. motor and fired by pulverised coal. The annual production of C.C.F. from this plant will be about 150,000 tons.

On all the process plants, great care has been taken to prevent offensive emission of gaseous effluents. The latest forms of gas washing equipment have been installed and final discharge is from high level chimneys.

Dispatch

The finished product will not be stored on the manufacturing site but will be transported by totally enclosed, hopper-bottomed rail wagons to a bulk storage building presently under construction on part of the site of the old fertiliser works at Salamander Street, Leith. The reason for selecting this location for the dispatch activity is to facilitate

handling of the highly seasonal traffic and in particular to eliminate any delays in dispatches to customers which might result from interference with movement within the dock area. The building being provided will house 40,000 tons of compounds in bulk and will be served by a conveying system for intake and discharge to an associated bagging plant. bagging plant, also under construction, is designed to provide for the high-speed loading of road vehicles or railway trucks with material packed in 1 cwt. valve type paper bags.

On the manufacturing site, a well-equipped workshop with store is provided to serve the needs of engineering maintenance. Immediately to the north of the entrance there is a building which houses the main office and the works control laboratory. In an adjacent building there is a washing and changing room, together with an attractive canteen. When construction is completed, it is expected that the works will give steady employment to some 200 people, whose welfare is catered for not only by good canteen and changing room facilities but by careful attention to working conditions throughout the factory.

In referring earlier to the size of the site, attention was drawn to the room available for further development. A start has already been made in this direction by the construction of a plant for the manufacture of an industrial grade of monammonium phosphate, for which there is a large demand for fireproofing purposes.

Flavours. This price list issued by Dragoco Holzminden includes flavouring materials selected from their general catalogue. Many new products have been developed during the last few years and this publication gives an up-to-date guide to the company's latest achievements in flavours.

P. and S. catalogue. The latest catalogue published by Polak and Schwarz (England) Ltd., after a lapse of several years, runs to 42 loose-leaf pages enclosed in a handsome leather-like folder. It contains properties and prices of perfumery bases, perfumes for cosmetics, toilet preparations, hair preparations, fixatives, and emulsified products such as lotions, creams and milks. A selection of the firm's wide range of essential oils and terpeneless oils is also listed.

THIAZOLES AND ANALOGUES some pharmacological applications

By E. G. Curphey

THE thiazoles and their nitrogen analogues are unequivocally associated with many physiological processes; for example, a thiazole moiety is noted in the structure of vitamin B1, the vitamin which is linked with the decarboxylation of pyruvic acid in vivo. The lack of this vitamin causes such diseases as beri beri and peripheral poly-Perhaps however the nitrogen analogue is even more important, being integrated with many of the vital processes of the living cell. The release of histamine in vivo is associated with asthma, hav fever and urticaria. imidazoles furthermore feature in the structure of nucleic acids, the benzimidazole pentosides being important residues in the ribonucleic acid of the cytoplasm as well as contributing to the structure of the deoxyribonucleic acid of the chromosome of the cell nucleus. The synthesis of imidazole analogues forms part of the scope of cancer chemistry. In vitamin B12, the anti-pernicious anæmia factor, the imidazole fragment is present as a 5,6-dimethyl benzimidazole - 1 -α -D-ribofuranoside. This vitamin is considered essential for the aerobic formation of purine and pyrimidine deoxyribosides. Finally the hydrolytic activities of such enzymes as trypsin, acetyl cholesterinase and ribonuclease have been postulated as due to the imidazole ring in the histidine residues.1

nal ate

toom hin

ons be

em

an

he

IC-

for

ad

ith

ve

a

re

of

ice

ses

ks

nt

nd

an

n-

ed

dy

le.

ot

ng

h-

ze

to

er

lv

he

he

de

or

or

y

r-

ir

ts

st

d

se

af

d

t

The uses of thiazoles and their analogues range from psychiatry aids and respiratory depression stimulation, to the treatment of hypotension and cancer.

The correlation between structure and pharmacological activity has required considerable experimental evaluation. In this way oral dosages, therapeutic efficiencies and the less evident side effects have been tabulated for many analogues.

The introduction of bromine into a thiazole nucleus has been shown to enhance the bacteriostatic characteristics of the thiazole nucleus; thus $4 - \beta$ naphthylethyl - 5 bromothiazole is lethal to staphylococcus at dilutions of 1:20,000, whilst the non-brominated analogue

is less active, being lethal at dilutions of 1:15,000.² Although in the example cited the derivatives exert an antagonistic effect on cell growth, they are nevertheless symptomatic in many of their other applications.

Aids in psychiatry

2:4-diamino - 5 - phenyl thiazole has been of clinical interest in the treatment of mental disorders and it is claimed that conditions of hypochondriasis are improved by its administration. This compound has also been used for the relief of depressed respiratory conditions, which often follows pneumonia, anæsthesia and barbituric intoxication. The clinical treatment is based on the thiazole in combination with $\beta\beta$ methylethyl glutarimide. It is thought that its therapeutic action may be correlated with biological processes involving thiamine.

In cancer research, the imidazoles and thiazoles appear to interfere in the growth mechanism of the cell. Modern cancer chemistry has concerned itself with the synthesis of purine analogues which can interfere with purine metabolism. Purine analogues in which the imidazole ring has been replaced by a triazole nucleus, have been prepared for pharmacological evaluation. Analogues as the 2,6-diaminopurines, again, can be in-corporated into cell ribonucleic acid at an even greater rate than can guanine, a natural metabolite.3 The in vivo synthesis of physiologically inactive ribonucleic acids has accordingly become mandatory in the quest for anti-cancer substances. Thus by the introduction of an adenine antagonist, for example, the surfeit of active deoxyribonucleic acid which occurs in rapidly proliferating systems as those characteristic of carcinogenesis may be reduced. The thiazole analogues of 6-mercaptopurine have, for example, shown

pronounced activity in leukæmia and many tumour systems.4 The more remote analogues like the 2amino - 1, 3, 4 - thiadiazoles (I: $X=NH_2$; $Y=SO_2NH_2$) have also proved active against a variety of neoplasms. The problem of toxicity, however, has always been a restricting factor in the chemotherapy of cancer. The latter has always been an exercise involving a reduction of toxicity at the same time maintaining a high therapeutic index. Alkylation of the amino nitrogen reduces toxicity, whilst substitution in the 5-positions of the nucleus attenuates the activity of the analogue. 2-Amino-1, 3, 4 - thiadiazole - 5 - sulphonamide has been tested for trials on melanomas, globioblastomas and lymphosarcomas. (II: X=AcNH; Y=SO,NH,) is an effective inhibitor of carbonic anhydrase enzyme and workers have shown that the latter analogue can reduce the effect of electric shock on mice.

In many ways thiazole behaves as a sulphur analogue of pyridine so that the thiazole carbonohydrazides resemble the pyridine carbonohydrazides in displaying tuberculostatic properties.⁵

Synthesis of pharmaceuticals

The thiazoles are also useful intermediates in the production of pharmaceutical products. The 2aminothiazoles are well known in the production of the sulphathiazole drugs, whose significant bacteriostatic properties are claimed as a result of their antagonising action on the metabolising of paminobenzoic acid, essential to many pathogenic bacteria. Vitamin B, has been prepared from 2-methyl-5-chloromethyl-6-amino-pyrimidine and 4 - methyl - 5 - β - hydroxy ethyl thiazole, whilst the biological preparation of vitamin B, from the yeasts of S. fragilis, ellipsoideus and cerevisiæ, by the addition of thiazole to the worts, has been known a long time. The more modern applications have been associated with the hydrogen analogues-the thiazolines and thiazolidines in the synthesis of penicillin. The early synthesis of penicillin by Heilbron

and Cooke using 2-phenyl-4-dimethyl thiazoline and a N-substituted acid chloride of a carboxyethyl succinimide proved disappointing, because of the low yields recorded (8%). Such mean yields probably emerged as a result of the number of polar centres involved in the reaction, so affording many side reactions. There was also the problem of stereo-isomerism. Such experiments were therefore only of academic interest. Sheehan, however, later overcame some of the earlier drawbacks and prepared the antibiotic in greater yields.6 He used the appropriate thiazolidine and obtained the arbitrarily designated a and β stereo forms. The aform of these intermediate penicilloates corresponded to the natural racemic penicilloates. The intermediate penicilloate (III) was

conveniently prepared from dipenicillamine and a t-butyl phthalimido malonaldehyde, the reaction postulated being attractively through an aldehyde ammonia analogue followed by the loss of water. The cyclisation of the β fused lactam was difficult in the earlier attempted syntheses of these antibiotics. Several expedients had been tried. Fused β lactam formation through the intermediate oxazolone by the catalytic removal of a benzyl alcohol was unsuccessful, as was the action of phosgene on methyl benzyl penicilloate to form the N-carboxy anhydride with loss of carbon dioxide. Sheehan thought the presence of bulky groups might impede lactam formation, whilst the acyl radical undergoing azlactonisation to yield stable oxazolones would be undesirable also. fused ring was finally obtained by the introduction of a sulphonamido group.

Cancer therapy

The imidazoles have been studied extensively as antimetabolites in cancer therapy. In combination with carbohydrate residues, the benzimidazole analogues have displayed regressions in lymphosarcoma in mice.7 Recent antibiotics as Puromycine actually embody such structures, their therapeutic activity being credited to the hydrolysis of the antibiotic to 9-

(3-amino-3-deoxy-β-Δ-ribofuranosyl)-6-dimethyl purine. Such substances have exhibited trypanocidal as well as tumour-inhibiting characteristics.8 This observation suggests that curative agents in cancer are directly concerned with the mechanism of cell growth. The 6-positions in the purine nucleus appear pharmacologically active.

Mercapto - 4 -isopropyl - 5 -aminothiazole has been proposed as a starting point in the synthesis of 5-isopropyl 2,4-thiohydantoin, the latter being of use as a hypoglycæmic agent in diabetogenetic conditions emergent from a sub-total pancreatectomy.

The nitrogen analogues, the 1,2,4triazoles, have been studied in conditions of high blood pressure.9 Such analogues would appear to behave as symptomatic drugs, acting on the autonomic effector cells. Large oral doses induce prolonged periods of hypotension. But their undesirable side effects included tachycardia. From tests on anaesthetised cats, the length of the side chain is an important criterion, lengthening, shortening or branching of this chain, adversely affecting the therapeutic characteristics of the derivative. The 1,2,4-triazoles probably function cholinergically, preventing the hydrolysis of acetyl choline released by the stimulation of the vagus nerve, the former being hydrolysed by cholesterinase. The model for such a mechanism has been illustrated by Bender and Turnquest using the hydrolysis of 1-nitrophenyl acetate by imidazole10 as the model. The initial stage is shown below.

The aralkylimidazolines, on the other hand, appear to function as adrenergic agents, inhibiting responses to epinephrine, and so thought to be of value in the study of peripheral vascular complaints. The 2-isocyanato imidazole, obtained by the action of 2-mercapto imidazole and cyanogen bromide, have antithyroid activities.11 the latter gland influencing the rates of oxidation in the living organism.

REFERENCES

1. I. B. Wilson and F. Bergman, J. Biol. Chem., 1950, 186, 683.

- 2. G. N. Mahapatra, Nat., 1956, 177, 938. 3. L. L. Bennett et al., Cancer Res., 1955, 15, 485.
- 4. D. A. Clark et al., ibid., 1953, 13, 593. 5. H. C. Beyerman and J. S. Bontekoe, Rec. Trav. Chim., Pays-Bas, 1953, 72, 262.
- 6. J. C. Sheehan and P. A. Cruickshank, J. Amer. Chem. Soc., 1956, 78, 3677; id. et al., ibid., 1950, 72, 5158.
- 7. D. Heyl, ibid., 1956, 78, 4492. 8. B. R. Baker et al., J. Amer. Chem. Soc 1955, 77, 13; id., ibid., 1954, 76,
- 9. C. Ainsworth and R. E. Jones, ibid., 1954, 76, 5651.
- 10. M. C. Bender and B. W. Turnquest,
- *ibid.*, 1957, **79**, 1652. 11. K. K. Koessler and M. T. Hanke, J. Biol. Chem., 1919, 39, 494.

CRYSTAL SIEVES

2838.

(Continued from page 102)

an isomorphous replacement of the type Na+Al³+⇒Si⁴+, and changes the concentration of the mobile intracrystalline cations such as Again, since the mobile Na+. cations are in the same channels as the sorbate the change in cation concentration modifies the sieve action.

Finally, the possibility of producing hitherto unknown kinds of sieve by direct synthesis was referred to. The great advantage of molecular sieve action lies in its extraordinary selectivity, and in the fact that one could choose, from the range of materials potentially or actually available, a sieve sorbent having maximum selectivity for the purpose in view.

In reply to a question on the use of quinol-urea polymers as sieve crystals, Prof. Barrer said that these materials were capable of anchoring molecules of suitable sizes, but because the windows were not big enough there was no way of release.

He told Dr. J. H. Wilkinson that the energy of absorption on zeolite sieves was very high, and that powdered and crystalline forms absorb similar amounts of sorbate. Dr. W. Mitchell, who asked for details of the experimental techniques, was informed that the sieve materials were supplied in pellets and must first be freed from interstitial water by heating to 300°-350°.

In reply to Dr. H. J. Barber, Prof. Barrer said that complex polyaromatic compounds could be applied to the zeolite in solution in isooctane as in chromatography. Zeolites are suitable for the isolation of only small amounts of such com-

PROGRESS REPORTS

HORMONES

77, 938. ., 1955,

3, 593, ntekoe, 1953, shank,

, 3677;

4, 76,

ibid.,

quest,

fanke,

102)

f the

nges

obile

bile

nels

tion

ieve

pro-

s of

rred

ole-

tra-

the

om

ally

ent

for

use

eve

nat

of

ble

WS

ras

on

on

nd

ns

te.

or

h-

he

in

ed

ıg

r,

X

e

n

1-

t

as

Synthesis and Related Topics

By C. A. Finch, M.A., D.Phil.

AS USUAL, most of the papers published since the last Report¹ have been devoted to new and ever more subtle ways of transforming one steroid molecule into another different functional groups. Since many of the ideas on the physiological behaviour of hormones can only be tested by the application of these compounds, the requirements of hypotheses on the nature of various types of metabolism govern the requirements demanded from the organic chemists. Some of the reactions resulting from these requests will be discussed below.

Biosynthesis and related topics

Methods for studying how complex molecules, such as hormones, are built up in the body have been developed to a fine art in recent years. Such techniques have involved the production of steroids labelled with radioactive atoms at known points in the molecule: the most frequently-used labelling atoms are deuterium and carbon-14, with, less often, tritium.

A useful way of labelling a molecule is to grow it by conventional microbiological methods with the labelled atom in the nutritional medium. For example, methyl-14C acetate, in a phosphate buffer at pH 5.2, can be used by yeast to produce a series of steroids. Using steroid-deficient saccharomyces cerevisiae, and identification of the products by reversed phase chromatography3 of the digitoninprecipitated fraction, 14C-counts and autoradiographs revealed the presence of ergosterol, zymosterol, lanostadienol, farnesol, and two unidentified components; in the digitonin-soluble fraction, the same methods showed squalene, some lanostadienol, farnesol, and three unknown components. The timeconcentration relationship was consistent with the proposed biosynthetic pathway: squalene-lanostadienol-ergosterol or zymosterol.

Further study of the formation of ergosterol has shown⁴ the nature of the transfer of the methyl group of methionine to the C(24) of ergosterol (I). This follows the proof

that the major path of this particular methyl group is to the C(28) position of ergosterol.⁵ The C(28) atom can also be obtained from formate; ⁶ a similar, but less specific, effect is also obtained using labelled sodium bicarbonate, formaldehyde, or propionate-(1 or 2)-14C.

There has been much investigation of the biosynthesis of the cholesterol system: a notable point has been the showing that vanadium inhibition can take place in this particular biosynthesis.7 The series of biosynthesis from acetate is: acetoacetate -β- hydroxy -β- methyl glutarate — β-methyl crotonatesqualene - lanosterol - zymosterol. It is shown that inhibition takes place between the 5 and 6 carbon intermediates; i.e. between β hydroxy-β-methyl glutarate and β -methyl crotonate; it is confirmed that this is the case, since, when biosynthetic 14C-squalene is employed as substrate,8 no inhibition found between squalene and cholesterol. The biosynthesis of cholesterones from β-hydroxy-βmethyl-δ-valerolactone has been studied in some detail.9 The same lactone, labelled with 14C

at the 2-position, has also been shown to be a precursor in the biosynthesis of β -carotene, related to vitamin A, using *Phycomyces blakesleeanus* and carrot slices.¹¹

A potentially important topic, the interactions between steroid hormones and co-enzyme components, has been investigated using the methods of physical chemistry. 10 A refinement of the distributionequilibrium method is used to measure the equilibrium constants for complex formation between several steroids and co-enzyme components in aqueous solution. From the relation of the structure of the steroid and the co-enzyme component to the equilibrium constant, it can be concluded that complexes result from interactions between the purine nucleus of co-enzyme components which contain purines, and the α -side of the C and D rings, and part of the B ring, of the steroid. In this region, the steroid molecule is nearly flat, which appears to be of primary importance for the formation of the complex. The interaction appears to be of a non-polar character, most of the required energy being derived from the recombination of water molecules which are displaced from the interacting surfaces.

Hormone synthesis

A considerable number of established paths to complex steroid molecules have been developed during the past few years: recent work has mainly been concentrated upon variations of these, increasing the possible variations, and the existing techniques.

A diene synthesis¹² using β -ethylamethylacrylic acid (II) with 2:3-dimethylbutadiene (III) has been used to give 1:3:4-trimethyl-6-

ethyl-Δ³-tetrahydro-benzoic acid (IV). This useful intermediate, with 6-methoxy-1-vinyl-3: 4-dihydronaphthalene gives an isomeric mixture of 7-methoxy methyl ethylhexahydrophenanthrene carboxylic acid, which is found not to be identical with that obtained by Anner and Miescher¹³ from racemic a-monodehydrodoisynolic acid, which possess œstrogenic activity.

In the course of a synthesis of some 14-iso-11-oxosteroids, Djerassi¹⁴ has studied the course of catalytic and chemical reduction of steroids of this type. For example, the product of lithium-ammonia reduction $22a:25a:5a:14\beta$ -spirost-8-en- 3β -ol-11-one (V) is shown to be $22a:25a:5a:14\beta$ -spirostan- 3β -ol-11-one (VI); this is shown by conversion of (VI) to the known

 $14\beta:17a$ -allopregnan- 3β -ol-20-one acetate.. This gives a compound of known stereochemistry, and an application of conformational analysis to the related compounds leads to the assignment of the 8a:9a-orientation (VII) to the

catalytic hydrogenation product of (V). This elucidation, and that concerned with the chemical reduction product, has a general bearing on the evaluation of conformational analysis in the metal-ammonia reduction of unsaturated ketones.

Some useful advances with microbiological transformations have been published. Workers¹⁵ at the

G. D. Searle laboratories in Chicago have shown that 1a-hydroxyandrost-4-en-3: 17-dione (VIII) and 2β -hydroxyandrost-4-en-3: 17-dione (IX) can be produced by the

action of a species of *Penicillium* on androst-4-en-3:17-dione. Subjecting dehydro-epianthrosterone to the same oxidative fermentation yields (VIII) and also 1a-hydroxydehydro-epiandrosterone. A 2β -hydroxylation has also been achieved by a group¹⁶ from the Schering Corporation and Rutgers University using several unidentified *Streptomyces* species. By this means pregn-4-en-17a:21-diol-3:20-dione (X)

(Reichstein's Compound S) in a peptone-sova bean meal-veast extract-cerelose medium is converted to pregn-4-en- 2β : 17a: 21-triol-3: 20-dione in a rather low yield. The same workers17 have also hydroxylated (X) in the 1-position (with unknown configuration) and the 2β position using a Dutch strain of Rhizoctonia ferrugena in a substrate of corn steep liquor, ammonium dihydrogen phosphate, yeast extract, dextrose, soya bean oil, and calcium carbonate. It is also reported that other species of Rhizoctonia have been used to transform (X) into cortisol, cortisone, and 11-epicortisol. The microbiological hydroxylation of corticosteroids unsaturated in the 1-position has also been reported.18

Oxidation of steroids in the 16-

position has been achieved at the Squibb Institute using Streptomyces roseochromogenus¹⁹ with 9a-fluorocompounds. By transformation of the appropriate fluoro compounds 16a - hydroxy-9a-fluorohydrocortisone (XI) and 9a-fluoropregn-1: 4-dien-11 β : 16a: 17a: 21-triol-3: 20-dione (XII) can be obtained

in yields of 50% and 20% respectively. The introduction of a 16hydroxy-group has been shown to result in complete suppression of the salt-retaining properties of these steroids without, apparently, impairing their glucocorticoid activity. Preliminary studies also show antiarthritic activity in man with (XII) (also known as triamcinolone) and confirm its lack of salt-retaining activity. An efficient synthesis of this steroid is therefore of considerable importance. Conversion of (XI) to (XII) can be achieved in 65% yield with a strain of Corynebacterium simplex by adding the steroid to a 24-hr.-old culture in a medium containing yeast extract, tryptone, pentane and glucose calcium.

Another group of 16a-hydroxyderivatives, from 2a-methyl steroids, have been prepared.²⁰ The 19-nordihydrotestosterone derivatives have been synthesised, and found to have powerful anti-æstrogenic activity.²¹

The British Drug Houses group has continued with their series of modified steroid hormones. A series of 6-methyl derivatives has been prepared.²² A series of 3β-hydroxy-5-ene derivatives is converted into their 6-methyl compounds by two methods. Using 3β-hydroxy-25D-spirost-5-ene, the 3:5-cyclo steroid is formed with toluene-p-sulphonic

acid; oxidation of the cyclosteroid with the pyridine-chromic acid complex gives 3: 5-cyclo-25D-spirostan-6-ene, which is treated with methyl magnesium bromide. The resulting Grignard compound with acid gave the required 3β-acetoxy-6-methyl-25D-spirost-5-ene (XIII).

t the

nuces

uoro-

on of

unds,

orti -

1:4-

1-3:

ained

ect-

16-

1 to

of

rese

im-

ity.

nti-

(IL)

and

ing

of

ler-

of in

me-

the

n a

et,

al-

KY-

er-

he

va-

nd

ro-

up

of

ies

en

V-

to

VO

D-

id

ic

st

compound can also be obtained from the 5a-bromo derivative, which is oxidised with the pyridinechromic acid complex. The resulting bromo-ketone is debromated with zine dust in acetic acid to 3β -acetoxy- 5α : 25D-spirostan-6ene; reaction with methyl magnesium iodide, followed by reacetylation and dehydration by Darzen's method gave (XIII) which was then degraded by the usual methods 3β -acetoxy-6-methylpregna-5: 16-dien-20-ene.

This is transformed into 6-methylpregnenolone; Oppenauer oxidation gives 6a-methyl-17a-pregn-4-ene-3: 20-dione and some 6a-methylprogesterone, which has also been obtained independently from pregnenolone. By similar methods, the corresponding 6-methyl-androstane23,24 derivatives have been prepared. Another method25 for obtaining 6-methyl derivatives, by conversion of 3-keto A4-steroids, via the 5a: 6a-epoxide, has also been developed.

Miscellaneous

The fatty oil of the slug Incillaria confusa has been studied, and found to contain a sterol component, as vet unidentified.26 An investigation²⁷ of the bile salts of a cœlacanth, Latimeria chalumnæ, Smith,28 has shown the presence of at least four components. Results so far suggest that the bile salts are very complex, and contain as major constituents alcohol sulphates probably not having the cholic acid or ranol-cyprinol type of hydroxylated nucleus.

The common sterol, stigmasterol, has been detected in cigarette smoke.29

REFERENCES

- C. A. Finch, Manufacturing Chemist, 1957, 28, (8), 378.
 E. Kodicek and D. R. Ashby, Biochem.
- J., 1957, 66, 35P.

- J., 1957, 66, 35P.
 E. Kodicek and D. R. Ashby, *ibid.*, 1954, 57, xii.
 G. J. Alexander and E. Schwenk, J.A.C.S., 1957, 79, 4554.
 G. J. Alexander, A. M. Gold and E. Schwenk, *ibid.*, 1957, 79, 2967.
 H. Danielson and K. Bloch, *ibid.*, 1957, 79, 500
- H. Danielson and K. Bloch, total, 1957, 79, 500.
 D. L. Azarnoff and G. L. Curran, ibid., 1957, 79, 2968.
 F. Dituri, F. A. Cobey, J. V. B. Warns and S. Gurin, J. Biol. Chem., 1956, 201.
- 221, 181.
 9. O. Isler, R. Ruegg, J. Wursch,
 K. F. Gey and A. Pletscher, Chimia
- (Switz.), 1957, 11, 167. 10. A. Munck, J. F. Scott and L. L. Engel, Biochem. biophys. Acta, 1957, 26,
- 397.
 11. G. D. Braithwaite and T. W. Goodwin, *Biochem. J.*, 1957, 67, 13P.
 12. E. Buchta and H. Bayer, *Chem. Ber.*,
- 1957, **90**, 1647. 13. G. Anner and K. Miescher, *Experien*
 - tia, 1946, 2, 409; Helv. chim. Acta, 1946, 29, 1889.

- C. Djerassi and G. H. Thomas, J.A.C.S., 1957, 79, 3835.
 R. M. Dodson, A. H. Goldkamp and R. D. Muir, ibid., 1957, 79, 3921.
 H. L. Herzog, M. J. Gentles, E. B. Hershberg, F. Carvajal, D. Sulter, W. P. Charneey and C. P. Schaffner, ibid, 1957, 79, 3929.
- ibid., 1957, 79, 3922.
 Greenspan, C. P. Schaffner,
 W. Charney, H. L. Herzog and
 E. B. Hershberg, ibid., 1957, 79, 3923.
- 18. E. Testa, Ann. chim. (Rome), 1957,
- 47, 1132. 19. R. W. Thoma, J. Fried, S. Bonanno and P. Grabowich, J.A.C.S., 1957, 79, 4818.
- 20. S. Bernstein, M. Heller, R. Littell,

- S. Bernstein, M. Heller, R. Littell, S. M. Stolar, R. H. Lenhard and W. S. Allen, *ibid.*, 1957, 79, 4555.
 A. Bowers, H. J. Ringold and R. I. Dorfman, *ibid.*, 1957, 79, 4556.
 D. Burn, B. Ellis, V. Petrow, I. A. Stuart-Webb and D. M. Williamson, *J. Chem. Soc.*, 1957, 4092.
 M. Aekroyd, W. J. Adams, B. Ellis, V. Petrow and I. A. Stuart-Webb, *ibid.*, 1957, 4099.
 V. Grenville, D. K. Patel, V. Petrow, I. A. Stuart-Webb and D. M. Williamson, *ibid.*, 1957, 4105.
 G. Cooley, B. Ellis, D. N. Kirk and V. Petrow, *ibid.*, 1957, 4115.
 T. Tanaka and Y. Toyama, *J. Chem. Soc. Japan*, 1957, 78, 1101.
 G. A. D. Haslewood, *Biochem. J.*, 1957, 66, 22P.
 J. Millot, *Nature*, 1955, 175, 362.
 A. I. Kosak, J. E. Swinehart, D. Taber and B. L. Van Duuren, *Science*, 1957, 125, 991. 1957, 125, 991.

PROTEIN HAIR CONDITIONER

The rather harsh methods involved in the waving and colouring of hair eventually lead to damage of the hair fibres which is sometimes irreversible. A protein degradation product now available from Protean Chemical Company, New York, is

Vericrest, a concentrated solution used for reconditioning damaged hair and for treatment of the hair before waving or colouring treatments. It is claimed to promote a more uniform penetration of bleaches and dyes into the hair. It may be incorporated in the sodium bromate solution used as the neutraliser in permanent waving.

Protein Hair Conditioner

Vericrest			 5	qt.
Triton X-100			 21	OZ.
Methyl p-hydro	xybenz	oate	 3	22
Propyl p-hydro	xybenz	oate	 3	22
Formaldehyde			 1	99
Perfume oil			 2	9.9
Tween 20			 10	99
Water to make	5 gal.			

Procedure: Mix the Vericrest with 21 gal. of water and add the Triton X-100. Heat half the mixture to 180°F., add the p-hydroxybenzoates and heat until the preservatives are dissolved. Cool to room temperature and add remainder of the Vericrest solution. Combine the perfume with Tween 20 and stir into the mixture. Add the formaldehyde and water to make 5 gal.—Schimmel Briefs, No. 270, 1957.

CORRESPONDENCE

To: THE EDITOR.

Zinc Methyl-Albumin Insulin

Dear Sir: In your November 1957 issue Mr. S. J. Hopkins refers to my article* on a new long-acting insulin — zinc methyl - albumin insulin.

He quoted that zinc insulin is "bound to a (methylated) non-antigenic albumin" — well, the point and the new idea is that this albumin is human (i.e. nonantigenic). I am immodest enough to consider that point of interest when my article is quoted.

Another objection: Mr. Hopkins refers to the duration of action of the preparation as just under 12 hr. May I quote from my article:

"On the basis of all 22 mean blood sugar curves, the duration of the effect of zinc methyl-albumin insulin may be estimated as an average of 21-24 hr., the minimum being about 18 hr. and the maximum presumably in many cases more than 24 hr.

OLE SKENSVED. Frederikshavn, Denmark.

* O. Skensved: Studies on a new longacting insulin: Zinc methyl-albumin insulin: Acta Endocrinologica (1957, 24, 159-78).

FERTILISERS and Plant Nutrients

Granulation • Caking problems • Phosphate • Manufacturing process • Magnesium

By D. P. Hopkins, B.SC., F.R.I.C.

Granulation

THE subject of granulation, mainly in reference to NPK compound fertilisers, can seldom be excluded from these Reports. The truth is that many of its problems are still unsolved. A technique that is efficient for granulating one compound formulation may not be as efficient for another. Much manufacturing progress with granulation in this country has rested upon an empirical, trial-and-error basis, with all too little scientific experimentation. To the engineer running a plant, the test of granulation is the proportion of material that has to be re-cycled through under-size or over-size rejection; when this is low, granulation as a process is operating efficiently. Whether the product will cake in the subsequent pile or bag is another test, and one that the farmer (and salesman) will consider more important. A third test is the uniformity and correctness of analysis-and bad deviations may incur legal penalties plus loss of manufacturing reputation. Conditions that satisfy these different criteria are sometimes in conflict, and this tendency for conflict has been increased by the industry's bold efforts to provide farmers with granular compounds with much higher plant-food

A considerable literature on granulating methods now exists, much of it by U.S. workers, although American interest in granulation is much more recent than British. What seems by far the best guide to U.S. "know-how" is a recently published survey-paper. To prepare this paper the authors visited 135 of the 171 U.S. plants said to be granulating fertilisers. Not only has much practical information been presented and collated by this direct attack on the subject, but

the paper is also well documented with research work references. Its usefulness for British granulators is restricted by the marked difference in raw materials used in American compound fertiliser formulation; ammoniation alone constitutes a major difference. Here the effect of ammoniation upon phosphate's water-solubility prevents its significant development; in America the different valuation for phosphate availability favours ammoniation. In U.S. practice, ammoniation and the "wet-stage of granulation can be integrated. This reduces the subsequent drying-load, not only because less water need be added to form wet granules but because the heat of reaction in ammoniation can also be utilised to assist granule-formation. It is made clear in the U.S. survey of granulation methods that many producers there have given up the original wetting-and-drying procedure, largely because of its high drying costs. "Hot" approaches to developing a suitable liquid phase are increasingly preferred, especially with mixtures containing high proportions of soluble salts (N and K). Temperature as a powerful influence upon granule-formation has had much less recognition in British practice -so far. Nevertheless, it is precisely those types of formulation that respond to the "hot" method -mixtures high in soluble saltsthat have been causing processing difficulties, and they are in increasing agronomic demand.

" Steam granulation "

An outstanding British contribution, also recent, ties up the U.S. "hot" approach and new British developments. The paper is not yet available, but a useful summary may be consulted.² The first section

of this paper deals with experimental work to elucidate the main influences that affect efficiency in normal wetting-and-drying granulation; this will be of great help to manufacturers still following this course. But the second section may well out-date much of the progress in the first; this fully describes the development of "steam granula-tion" by a major British manufacturer. Although small-scale work had not shown steam to be better than water in plasticising the initially powdered mixture, it was found to have many advantages in largescale operation. It enables wet granule formation to be achieved with a totally smaller addition of water, including the steam portion. The heat evolved causes drying to start within the granulating cyl-inder, thus markedly reducing the load upon the dryer. There are general improvements in proportions of material re-cycled, in hardness of granule, etc. It is said that some formulations high in soluble salts that are almost impossible to granulate by the cold wetting method are readily steam-granu-lated. Considered alone, the British development might be assumed to indicate that steam penetrates the particle surfaces of the dry mixture much better than water: but in conjunction with the U.S. work, in which heat of ammoniation or other reactions is utilised to form granules, is it not more probable that the significant influence of steam is in its temperature-raising property? The era of cold granulation may be fast disappearing.

Caking problems

One point upon which British and U.S. opinion is firmly agreed is that the problem of caking on storage is best countered by low moisture-contents in final granular product. This necessary condition has long been emphasised in these Reports, and even before much published work on the subject had appeared. Any processing modification that enables pre-dried-stage granules to be formed with smaller additions of water is basically advantageous, for heavy demands upon the drying cylinder or cylinders tend to reduce rate of production, to increase fuel requirement, to intensify the fume emission trouble, and to increase the cost of plant maintenance through corrosion. Another recent

British paper on caking hazards a I the conditions that induce caking should be referred to.3

peri-

nan

y in

anu-

help

this

may

ress

the

ula-

mu-

rork

tter

nit-

und rge-

wet

ved

of

ion.

to to evl-

the

are

or-

rd-

hat

ble

ible

ing

nu-

the

as-

ne-

the

nan

the

on-

sed

ore

in-

ra-

of

lis-

ish

eed

on

ow

lar

on

920

ch

ad

a-

ge

ler

lly

ds

10

of

e-9

ne

se

ce nt

st

The particulate size or shape of raw materials used is not without important bearing. The major British paper first referred to above stresses the superiority of the "stubbier" crystal-shape of synthetic sulphate of ammonia; mixtures using this form of nitrogen require less water-incorporation for granule-formation than like mixtures based upon needle-crystalline sulphate of ammonia. One has been able to confirm this in granulation practice. In U.S. the use of coarsemesh muriate of potash has been widely exploited, but some recent comments4 indicate that this approach to better granulation is not without disadvantages. The optimum size of potash particle for effective granulation is not also the optimum size for good mixing, and it is stressed that materials for granulation should all be of fine-mesh size if analysis deviation is to be adequately minimised. The validity of this view in any country depends, of course, upon the width of permissible variations in that country's fertiliser legislation. Here the most recent adjustments in variations have taken some account changes in manufacturing method, including the advent of granulation; one doubts whether similar adjustments have occurred in the multi-State legislation of U.S. In the same U.S. report the official criticism of coarse potash use was supported by a manufacturer, who urged that coarse potash should never be used unless it was certain that fine-mesh potash could not.

The devotion of so much of this Report's space to a single topic may incur criticism, but in the writer's view the technology of compound granulation, after some 15 years of somewhat confused groping, is at last on the threshold of clarification. The importance granulation cannot be overemphasised. Despite all its production problems, it has already revolutionised British farm fertiliser practice by its suitability for placement-drilling which labour and time in application. It is, more belatedly, revolutionising U.S. farm fertiliser practice. Without granulation, the case for using mixed instead of unmixed fertiliser materials is much less strong. A

new application machine developed in New Zealand is claimed to enable farmers to mix straight fertilisers simultaneously with application; the appliance has three flow-rate controlled hoppers, and mixing occurs immediately before fandraught spreading.5 If the officiallyendorsed claims for this machine are valid, the extra cost of compounding can be justified only when the drill-suitable granular condition has also been conferred.

Phosphate

Long-term Swedish experiments with superphosphate have been Results of rotationdiscussed.6 eropping on plots (a) given no phosphate, (b) given half-rate phosphate, and (c) given full-rate phosphate, showed that over 14 years a considerable economic return was obtained from the provision of phosphate. All plots received a constant standard of potash and amounts of nitrogen according to current crop needs. Twenty-two per cent. more total food was produced from (b) and 31% more from (c), taking (a) as the basic standard. The value of the extra food produced for (b) was nine times the cost of the superphosphate applied, and for (c) six times the cost of the superphosphate applied. A higher level of available manganese was found in the soils of plots given the full-rate phosphate dressings; other influences upon trace nutrients or upon pH were not significant.

Radio-isotope greenhouse tests have compared the influences of surface area and chemical form upon phosphate availability from insoluble phosphatic materials.7 Basic phosphate and dicalcium phosphate were used on two test plants. The fertiliser samples had widely differing surface areasfrom 0.7 to 22.8 sq. metres per gramme. Responses to dicalcium phosphate were much the same, whatever the surface area of the material; responses to basic phosphate were lower, though its surface area was much higher than that of any dicalcium phosphate sample. Chemical form therefore was considered to be a far more important influence upon availability than particle size.

Manufacture

In the last report a TVA rapidprocess method for making superphosphate was mentioned; so, too, was Nordengren's suggestion for making rapid and under-acidulated superphosphates. A U.S. patent⁸ covers the addition of 0.05% of carbon-substituted alkylbetaine, with 10 to 16 atoms in the alkyl group, to the sulphuric acid used in superphosphate production. The intensity of acid fumes in the reaction vicinity leads to a superphosphate with curing time reduced from six to two weeks, with a trend towards lower moisture contents, and with increased ammonia-ab-

sorbing capacity.

A new TVA phosphatic material for use in making high-analysis liquid fertilisers and in making solid compounds has been described.9 This is a liquid product formed by hydrating combustion gases from a phosphorus burner with water sprays. It has a content of 76% P2O5, nearly half of which is in ortho-phosphate form, slightly under half in pyro-phosphate form, and the rest in a poly-phosphate

form.

Magnesium

The publication in English of a notable German study of the role of magnesium in plant nutrition should be referred to.10 Besides the significance of magnesium as a central component in the chlorophyll molecule, other functions in plant metabolism are stressed by the author. Magnesium's functions in plant development are interestingly correlated with this element's outstanding ability to form double and other complex salts. The book draws timely attention to the tendency to neglect its supply.

REFERENCES

- T. P. Hignett and A. V. Slack, J. Agric. and Food Chem., 1957, 5, 814.
- 2. A. T. Brook, paper read to Fertiliser
 Society, Nov. 28, 1957. To be
 published during 1958 as Proc.
 Fertiliser Soc. Summary in Chem.
 Age, 1957, 78, 877.
- 3. A. L. Whynes and T. P. Dee, J. Science Food and Agric., 1957 (8),

- 577.
 J. O. Hardesty, Agric. Chemicals, 1957, 12, (12), 33.
 J. L. Doutre, N.Z. Journal of Agric., 1957, (95), 539.
 Anon., Agric. Chem., 1957, 12, (10), 42. Original Swedish reference (C. Bernetzen) pat cities.
- Weiss Terefelect
 G. Berngtsson) not cited.
 M. A. Norland, W. A. Jackson and G. A. Wieczorek, J. Agric. and Food Chem., 1957, (5), 848.
 Acid Corporation, U.S. Pat. 2797986,
- Anon., Chem. Engg., 1957, (64), 140.
 A. Jacob, "Magnesium, the fifth major plant nutrient." Staples. Pp. 159. 1957.

PLANT AND EQUIPMENT

Synchronous Timer

The auto-reset timer, type 7000, developed by Rodene Electrical Co. Ltd., is a clock-faced flush mounting unit

It is controlled by a switch or push buttons and can be connected to reset automatically at the end of the timed period or when a resetting contact is opened. It can switch one load on or off during timing, and a second load from the end of the timed period until the timer is reset.

A pulse output can also be obtained at the end of the timed period which can be used to start a second 7000 timer, and it is claimed that in this way any number of 7000 timers can operate automatically in sequence with, if necessary, the last one re-starting the first one. Seven time-scales are available initially, ranging from 0-15 sec. to 0-3 hr., and others are planned. During timing, a red hand remains stationary to mark the set time, while a black hand travels back to zero to indicate the unelapsed time. When it is necessary to prevent unauthorised alteration of the time setting, the instrument can be supplied with the control knob on a removable shaft.

It weighs 3 lb. with a max. consumption of 16VA and the contacts are rated at 3 amp. at 440v. A.C., or 5 amp. at 250v. A.C. It is $4\frac{1}{2}$ in. in dia. and its overall length covers $6\frac{5}{8}$ in. The list price is £17.

Turbidity Meter

Rapid readings of water clarity can be achieved by the use of their turbidity meter, say Paterson Engineering Co. Ltd., It is a simply constructed optical instrument and it is reported to be permanently ready for use as it requires no adjustment or preparation of standard solutions.

The instrument consists of a vertical ebonite body of 1 litre capacity, on the back and front faces of which are mounted two mirrors facing each other at a slight angle and protected by aluminium back plates. Each mirror has an aperture, one permitting the passage of a ray of light from a lamp of standard



Flush-mounting auto-reset timer.

strength and the other allowing the opposite mirror to be viewed.

To operate the instrument the ebonite head is removed and a sample of liquid is poured in until the mirrors are completely covered. The head is then replaced and when the electric light is switched on multiple reflections of the light spot are observed in the form of a row of light spots on the mirror face opposite the viewing aperture. The number of spots visible indicate the turbidity of the liquid, and to obtain a reading a slider, actuated by an ebonite knob on the right-hand side of the head, is moved until it touches but does not obscure the last visible light



Optical turbidity meter.

spot. An arrow on the indicating knob gives a direct reading in units of turbidity on a circular scale.

A vertical regulating rod enables the operator to use the slider as a stirrer, independently of the control knob, in order to prevent inaccuracy due to the settlement of the suspended content. It is stated that the instrument can easily be cleaned with the aid of a special set of brushes.

The turbidity meter is claimed as suitable for direct readings of turbidity up to about 8 units. Determinations on more turbid liquids are obtained by dilution of the sample. Its reported accuracy is such that readings as low as, or even lower than, 0.2 unit can be obtained.

The apparatus is portable, constructed of rustless materials and requires no special skill in operation. It can be supplied for either battery or mains use.

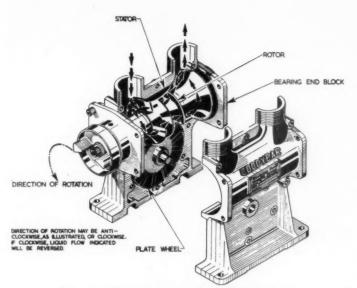
Archimedean Pump

A continuous, self-priming, selflubricating pump designed by Goodyear Pumps Ltd. is a positive axial-flow unit employing a screw which engages with a rotating plate, so producing a pulseless action that is reported to be virtually positive. In principle, it is an adaptation of Archimedes' lift

The rotor and plate wheel are the only moving parts, and since the rotor spins on its own true centres there is said to be no tendency to roll around and rub against the surrounding rubber stator. The rotor is supported on a shaft on taper roller bearings which, in order to retain the lubricant and to exclude foreign matter, are protected by lip seals.

The symmetry of the design of the pump means that the rotor can turn in a clockwise or anticlockwise direction, permitting the direction of flow to be chosen at will

Mechanical face seals, running on ground and lapped faces, completely seal the shaft. A chamber between the seals and the bearings is fully vented to atmosphere, thus ensuring that no fluid pressure can build up against the bearing assembly.



This pump is an adaptation of Archimedes' lift pump.

A feature of the pump is the absence of metal-to-metal contact. All engaging surfaces are rubber-to-metal, fluid lubricated. This arrangement was designed to reduce frictional losses to a minimum.

ating

units

ables

er as

the

event ment

It is

can

of a

ed as

nits.

n of

racv

as.

can

con-

and

ion.

ther

elf-

by

tive

rew

ing

less

vir-

is

lift

are

nce

rue

no

ub

ber

ed

gs

he

gn

of

or

ti-

he

en

ng

n-

er

gs

e,

re

ıg

of

A special relief valve is supplied where shut-down valves are incorporated on the delivery side. This valve automatically lifts at the pressure selected. In the event of a valve being closed against the pump the whole of the output is re-circulated to the suction side without damage to the pump or The relief valve, prime mover. which is fully automatic, is also fitted with a level for hand operation. According to the company, valves of this kind are not only for protection from valves closed against the pump, they are also useful when starting-up against a long, full pipe-line, particularly when the fluid is viscous.

It has a speed range of from 750 to 3,000 r.p.m., and will, say the company, run successfully at 6,000 Other features claimed r.p.m. are its extreme lightness and portability. Delivery pressures up to 85 p.s.i. or 200 ft. head per stage may be employed (higher in approved cases) and suctions of 271 in. of mercury are possible. It can be supplied with the pump casing and rotor manufactured in materials best suited to the particular type of application—light alloy for portable units, Mechanite for process pumping and bronze for marine work. The pumps may shortly be available with a nickel finish inside and outside.

Three sizes of the pump $(1\frac{1}{4} \text{ in.}, 1\frac{1}{2} \text{ in.}$ and $2\frac{1}{2} \text{ in.}$ suction and delivery connections) requiring prime movers of from $\frac{1}{3}$ to 16 b.h.p. cover a range of outputs from $4\frac{1}{2}$ to 167 gal. per min. against heads of from 50 to 200 ft. The $1\frac{1}{2}$ in. pump weighs 11 lb. and measures $8\times4\times9$ in. It can deliver, at 3,000 r.p.m., 31 gal. per min. against a 200 ft. head and requires a prime mover of $3\cdot1$ b.h.p. only. This single-stage pumping is carried out at $61\frac{9}{9}$ efficiency.

Graphite Bursting Discs

Bursting discs of carbon and graphite have been introduced by Powell Duffryn Carbon Products. They are claimed to reduce creeping or deforming tendencies sometimes found in metals.

The assembly comprises a twopart carbon holder and a replaceable graphite disc. The design of the holder and disc is such that replacement discs are easy to install, and it is also stated that location of the disc in the holder is fool-proofed by means of the special slotted holder arrangement. The assembly clamps between pipework flanges adjacent to the installation to be protected.

The standard range is available in sizes 2 in., 3 in., 4 in. and 6 in. bore. Pressures between 5 p.s.i.g. and 75 p.s.i.g. are offered and bursting accuracy is guaranteed within $\pm 5\%$ of the rated burst

pressure. For discs rated 20 p.s.i.g. or below, vacuum supports of either bar or dial type are available if the possibility of vacuum conditions within the vessel exists. Working pressures may be up to 75% of the nominal burst rating. Special ratings are also available and the company has recently produced for the U.S. market 6 in. discs rated at 1 p.s.i.g. vacuum for the protection of lead lining in process vessels under conditions of negative pressure.

The assemblies are stated to be resistant to the corrosive effects of a wide range of contact materials, and it is claimed temperatures up to 160°C. can be tolerated without deterioration of the physical properties of the disc or reduction in bursting accuracy.

Standard factory control procedure involves the application of 10,000 pressure reversals at 75% of burst pressure, followed by full burst pressure which disintegrates the disc within the guaranteed accuracy limits.

Holder costs are reasonable, and are generally first costs only.

Turbo-cleaver

The "Turbo-cleaver" has been designed by the Moritz Chemical Engineering Co. Ltd., for the speedy dissolution, cleaving and mixing of lumpy and viscous materials.

The machine employs an impeller with specially designed cutting vanes and an outer stationary crown which acts as a baffle and increases the cutting action of the blades. The size of the impeller bears close relationship to the diameter of the vessel to enable it to operate without cavitation in very viscous media.

The provision of a bottom entry drive leaves the top of the vessel free. The impeller shaft and gland are adjusted on the upward shaft extension of a reduction gear unit, the latter forming the base supporting the vessel. As the gland is mounted not on the bottom of the vessel but on a machined flange centred in relation to the impeller good alignment is assured by the makers. The section of the shaft passing through the gland is chromatium plated and polished.

The impeller is said to be shockresistant, making it possible to break up large solid lumps, such as china clay. Operating time is reported to be particularly short in the preparation of neoprene or rubber-based glue and adhesives. In spite of the use of a gland the unit is said to be leakproof, even under pressure.

The Turbo-cleaver is available in four sizes, 6 ft. 4 in., 7 ft., 8 ft., and 10 ft., with respective working capacities of 44 gal., 100 gal., 220 gal., and 660 gal.

Vapour Rheostat

In starting up slip ring electric motors it is necessary to interpose resistances in the rotor circuit to prevent excessive current on starting. If this were not done (it is of course mandatory) the electricity supply would be seriously overloaded at peak factory start-up periods.

The control is normally exercised by the use of hand operated or automatic starters of the stepped resistance type. From economic necessity the number of steps has to be limited so that it is difficult to obtain smooth accelera-

tion of the motor.

A French invention which is now being introduced to the British market under the name Vapormatic, is a starter with infinitely variable resistance based on the difference in resistance of a liquid electrolyte compared with that of its vapour. The electrolyte is a 20% solution of caustic potash or sodium or potassium carbonate When vaporised in tap water. this solution offers 50 times more resistance than when liquid. In its simplest form the apparatus consists of two electrodes located opposite each other in a small chamber of insulating material (steatite). This chamber is submerged in a tank of electrolyte with which it is connected by means of orifices. When a high current is passed through the electrodes across the chamber the resistance of the electrolyte causes local heat which almost instantaneously vaporises the liquid electrolyte between the electrodes. The chamber thus immediately fills with vapour and the resistance in the circuit is at its maximum. During the starting cycle, as the motor accelerates, the rotor current gradually reduces so that the rate of vaporisation is reduced. Gradually, as the current and heat decline, the liquid electrolyte returns progressively to the chamber, the expelled vapour being condensed in the main volume

of liquid in the tank. In this way the resistance inserted into the rotor circuit is controlled precisely and sensitively by the rise and fall of the rotor current. When the starting cycle is completed the electrode chamber is once more filled with liquid electrolyte, the conductivity of which is sufficient to carry the full load rotor current, and the apparatus is short-circuited by a contactor.

The advantage of this ingenious vapour rheostat is that resistance is introduced into a circuit almost instantaneously and is progressively eliminated along a smooth curve in contrast to the "steps" of

conventional starters.

The Vapormatic is made in one size only. Each unit, by simple regulation of the volume of the electrode chamber (by means of nylon inserts) is capable of starting a motor of up to 40 h.p. over a wide range of starting conditions. For larger motors it is only necessary to connect in parallel additional units at the rate of one for every further 40 h.p. required.

Vapormatics take less than half the space required for conventional slip ring motor starters of equal capacity and require comparatively little maintenance—the electrolyte level should be checked every three to four months and topped up

Hypalon hose in use at bleach factory.

with water if necessary to compensate for evaporation.

Of greater importance is their price, which is approximately £100 compared with £170 for a conventional automatic starter of equal

capacity.

The Vapormatic was invented by a Frenchman, M. Berard, and is manufactured and marketed in France by Association des Ouvriers en Instruments de Precision. Already many thousands have been supplied to Continental factories, notably the great Renault works. Berard has sold the United Kingdom and British Commonwealth rights (except Canada) to Lee Guinness Ltd., of Newtownards, Ulster, who are building a 55,000 sq. ft. factory for producing Vapormatics and other equipment. Lee Guinness Ltd. was formed in 1934 when the late Kenelm Lee Guinness sold the KLG sparking plug organisation to Smiths of Cricklewood.

It is anticipated that the U.K. potential market for the equipment may be three times as great as in France, where approximately 5,000 units are sold each year. applicability is confined to slip ring electric motors which account for perhaps 15-20% of all electric motors used in industry. apparatus is best suited to duties involving infrequent start-ups, such as, for instance, motors driving compressors, pumps, presses, conveyors, etc. - units which are switched in at the beginning of the day and off again at night. It would not show the same economies in duties requiring frequent startups, in which cases it may be best to use a starter specially designed for the job.

Hose Resists Bleach

A length of *Hypalon* hose has been in constant use for three years at a bleach manufacturing plant in the U.S.A. It was found that rubber hose previously used broke down after a few months' wear, contaminating the bleach with black particles. The hose is used to recirculate process liquor while the bleach is being made, and to transfer the finished product to storage. *Hypalon* is a synthetic elastomer manufactured by Du Pont and distributed by Durham Raw Materials Ltd.

For further information use the coupon on page 132.

BOOK REVIEWS

Quantitative Organic Analysis

heir

ven-

qual

ited

and

l in

iers

Al-

een

ries,

ks.

ing-

alth

Lee

rds.

000

nor-

Lee

934

iess

ani-

.K.

ent

in

000

Its

slip

unt

tric

The

ties

ich

ing

on-

are

of

It.

ies

rt-

est

red

ias

ars

int

nat

ke

ar,

ick

re-

he

to

to

tie

Du

m

the

st

By James S. Fritz and George S. Hammond. New York: John Wiley; London: Chapman and Hall. 303 pages+ix. 52s. net.

THE title of this book gave little idea of the scope or purpose of the work and at first perusal it was a little disconcerting to find, for example, that the whole subject of ultra-violet, visible and infrared spectrophotometry was covered in less than 30 pages. A reference to the preface, however, showed that the contents of the book had

The authors considered that there was a need for a teaching text for use in the presentation of courses at the later "undergraduate" or "beginning graduate" level of instruction, more especially in view of the lack of attention given to the

been carefully planned.

analysis in colleges and universities. It is intended that the book should enable students to become familiar with typical established procedures, including their limitations, and also to obtain as much information as possible concerning the design of new methods. Such a training is of particular interest in the investigation of selective methods for the determination of individual constituents of mixtures of compounds

teaching of quantitative organic

The book contains chapters on Titrations Acid-Base in Nonaqueous Solvents, Indirect Acid-Base Methods, Oxidative and Re-Methods, Manometric ductive Methods, Metal Ion Complexes, Elemental Analysis, Kinetics in Analysis, Spectrophotometric Methods, Separations, Physical and Polarographic Methods, Solving New Analytical Problems, and Laboratory Procedures. Each chapter deals broadly with the subject and does not confuse the reader with unnecessary detail.

with the same functional groups.

The main purpose of the work is the presentation of basic principles, and it is refreshing to read a book which is specifically designed for the teaching of analytical chemistry; too often, at the present time, analytical knowledge has to be acquired by hard and bitter experience. Particularly valuable is the way in which this book tries

Bookshop Service

All books reviewed in Manu-FACTURING CHEMIST and all other scientific or technical books may be obtained from:

> Technical Books, 308, Euston Road, London, N.W.1. Telephone: Euston 5911.

Prompt attention is given to all orders.

to maintain an overall balance of the different techniques.

Although there is probably a limited use for this book in the present teaching structure of English universities, in the opinion of the reviewer it fully covers the purpose for which the authors wrote it and is a welcome addition to the growing number of publications which, it is hoped, will bring about a new approach to the teaching of analytical chemistry.

R. E. STUCKEY.

The Terpenes-Vol. V

By the late Sir John Simonsen and W. C. J. Ross. Cambridge University Press. Pp. 662. 84s. net. The first edition of Simonsen's classical work, "The Terpenes, appeared in 1931 and was intended to deal with the chemistry of terpenes as such, rather than their place as constituents of essential oils, a topic which was then adequately covered in the English language by such books as Parry, The Chemistry of Essential Oils, and Finnemore, Essential Oils, Guenther's six volume work not appearing before 1947. In those days the book ran to only two volumes, the first dealing with the simpler acyclic and monocyclic terpenes and the second with the dieyelic terpenes and certain of the sesquiterpenes. In 1947 the first volumes of the second edition made their appearance and for these Sir John had the collaboration of Dr. Owen of the Imperial College of Science and Technology for the first three volumes, which covered the ground of the earlier edition but included in volume III a section on the diterpenes and a revised section on volumes I and II.

Volumes IV and V dealing with the triterpenes were written in collaboration with Dr. W. C. J. Ross during the last few years of Sir John's life. Dr. Ross had himself carried out many investigations on the triterpenes, particularly in collaboration with the late Prof. G. A. R. Kon. Sir John, however, had not worked very much with these compounds himself, but quickly mastered the very intricate formulæ involved and the principles of the elucidation.

Volume V, which covers the literature up to the end of 1953, consists of five chapters dealing with the triterpene hydroxyacids, hydroxy lactones, hydroxyaldehydo acids, hydroxyketoacids and the stereochemistry of the triterpenes, respectively. Of these, the first, which is subdivided into tetracyclic and pentacyclic hydroxyacids, takes up nearly three parts of the book. A large section in this chapter is devoted to the hydroxyacids of unknown constitution, many of them sapogenins.

The chapter on stereochemistry includes interesting accounts of conformational analysis and the method of rotational differences.

The book concludes with addenda to volume III by Sir John Simonsen and Dr. de Mayo bringing up to date the material on sesquiterpenes and diterpenes (this section includes references up to 1956). The series of brilliant investigations by Prof. Barton and his school on the structure of caryophyllene, as well as the recently proved structures of other sesquiterpene hydrocarbons (cedrene, longifolene), are included in this section.

The book is remarkably free from trivial errors, although the use of a capital letter for the specific epithet in botanical names occurs occasionally. The first three volumes in this series very rarely gave details of the absorption spectra among the list of properties, an omission which has been avoided in volumes IV and V.

Sir John was engaged up to the end in the collection of material for a third edition of his book and it is much to be hoped that his co-authors will keep this task in hand so that "Simonsen" retains its position as the standard work on terpene chemistry for many years to come.

G. B. PICKERING

NOTES AND NOTIONS

WORLD LANGUAGE

Two of the greatest blessings left by the British in India were an excellent Civil Service and the English language. A common official tongue has been of supreme usefulness in that multilingual subcontinent. Now many chauvinistic Indians want to eradicate English and replace it with Hindi. Nehru and all responsible leaders recognise the folly of this and constantly emphasise the need to retain English. It would be madness to throw English overboard, said Mr. Nehru recently, just when it was steadily and rapidly becoming an international language. Even the Russians, he said, were striving to cultivate it. About 35 million Indians, 10% of the population, understand English.

It is a pity that other and much smaller nations do not adopt Mr. Nehru's attitude of "stern realism" towards English. By all means teach a child its ancestral language, but do not deprive it of the benefits of English because of supposed past grievances. How many of the hundreds of millions of people who speak English really are English, and anyway what's in a name?

The extent to which English is becoming a world language is borne home in countless ways. Recently I saw in a German magazine an advertisement of an Italian soap machine manufacturer carrying a fascsimile of a testimonial letter from a Japanese soap maker. The letter was in English. No wonder the English are poor at learning foreign languages.

RUSSIAN SALARIES

IN WESTERN countries it is considered proper for the man who administers drugs to earn more than the man who makes them. How different is the scale of values in the Soviet Union. There a Ph.D. chemist can earn 4,500 roubles a month against an M.D.'s 1,500. Even an ordinary chemist can earn as much as a physician, while the coal miner earns twice as much. Indeed, a miner can earn 4,000 roubles a month, which is more by 500 roubles than the manager of a factory employing 500 gets. It is extraordinary how much value is placed on the work

of the miner and how little on that of the doctor. Clearly healing is regarded as much less productive than mining. Admittedly even in this country a miner can earn as much as a doctor, but there would be a justifiable outcry from the B.M.A. if their members drew less than members of the N.U.M.

It seems that in Russia one of the few professions to earn more than the sacrosanct miner is that of university professor. Unlike his comparatively ill-paid British colleague, the Russian professor can earn from 6,000 to 11,000 roubles a month. Indeed, the highest salary in the U.S.S.R. goes to the President of the Academy of Sciences who, I believe, is a chemist.

THEATRE SCENTS

A GENTLEMAN has written to the newspapers to complain about excessively perfumed women theatre audiences. He likens the practice to the burning of incense and seeks to draw a somewhat sacrilegious parallel between going to the theatre and going to church. What, I wonder, does he expect to smell in a theatre? Does he want the frigid smell of carbolic, the mountain smell of pines, the Caporal-dominated smell of Paris or the curious fug of the London Underground? Does he want the chlorinated odour of the swimming bath, the tarry, exhaust-ridden smell of a busy road on a hot day, the musty fragrance of a cathedral crypt or the coumarin of fresh-cut grass? Or does he want no smell at all? If so, how dull. One of the pleasures of going to a London theatre and sitting in an expensive seat is surely the exciting whiffs of expensive perfumes. These smells are absolutely right in their context and we should have more of them, not less. Let them clash and struggle with each other, for they are part of the powder and paint of theatrical make-believe. Unless one is afflicted with anosmia. surely these scents are the triggers of memory, capable of bringing vivid recollection. Deprive us of them and we lose part of our experience of life.

As for the religious implications of perfume, I wonder how Father Boylon and his fellow monks of the

Cistercian monastery of Caldy Island, Pembrokeshire, are getting on with their plan to sell their monastic perfumes in the United States? "Caldy No. 1," made from native lavender, is the first to come from the monastery stills. and Father Boylon is trying to sell it in the U.S. in the hope that the dollar bait will induce the Board of Trade to permit him to use 100% alcohol to make even better perfumes. The success of the enterprise may determine the finances and the fate of the monastery.

THERMONUCLEAR PARITY?

THE SCIENTISTS who built and operated the Zeta thermonuclear machine have scrupulously avoided making invidious comparisons between their achievements and those of the Americans. This impartiality has also been practised by most of the serious press commentators. It was with some surprise, therefore, that I read in the official American Chemical Society weekly, Chemical and Engineering News, the statement, "controlled thermonuclear reaction research on both sides of the Atlantic seems to be on a par." This is like saving that swimming the Thames is the same as swimming the Channel because, after all, you have to know how to swim to do either. These are the facts: Zeta's torus (ring-shaped aluminium tube) is 1 metre in bore and 3 metres in diameter. The American Perhapsatron has a torus with a bore of only 5.3 centimetres and a diameter of 32.4 centimetres. Zeta reached 5 million deg. and produced neutrons in August, the Perhapsatron reached 6 million deg. and produced neutrons in December. Most important of all is that Zeta held this critical temperature for from 2 to 5 milliseconds, while the Perhapsatron held it for only 2 to 3 microseconds. The longer the gas can be held at high temperature the stronger is the possibility of thermonuclear reactions occurring. That is why the Zeta achievement of holding the temperature one thousand times longer than any other machine is so important. Scientific impartiality is a good thing if practised by everyone.

Cicerone

News...

Drug manufacturers defended in Commons

The Government's decision to raise Health Service contributions caused more criticism from Labour M.P.s about the cost of drugs. The proposed increases, payable weekly, are 6d. for men, 4d. for women and 2d. for juveniles with, in each case, an additional 2d. from employers. This will raise the total contribution from an employed man to 2s. 4d., of which he will pay 1s. $10\frac{1}{2}$ d. and the employer

Opposing the increases in the House of Commons, Miss Herbison urged the Government to be firmer with drug manufacturers if it was concerned about costs. A Conservative M.P., Major Tufton Beamish, said the Opposition had a bee in their bonnet about the drug bill. The wholesale price of drugs had gone up by only 6-6% since June 1949. "Well over half of proprietary medicines are either cheaper or no more expensive than their standard equivalent," he pointed out

The Minister of Health, Mr. Walker-Smith, said that the N.H.S. would cost £740 million in 1958-59, £31 million more than the out-turn for the current financial year. Even at the higher rate the contributor was getting a good bargain. Mr. Simon, Financial Secretary for the Treasury said that there had been a fourfold rise in N.H.S. costs but contributions had been increased only 1s. 2d. per week, while average earnings had increased by £5 10s. over that period. In the first year the Service had cost £450 million. Next year it would cost four times the original estimate.

Starch convention

Caldy

tting

their

nited

nade

first

stills,

sell

t the

use

etter

iter-

nces

2

and

lear

ided

be-

ose

lity

t of

ors.

ere-

cial

kly,

ws.

no-

oth

be

hat

me

ise.

OW

the

ped

in

he

rus

res

es.

nd

he

on

in

all

ls.

or

he

gh

he

e-

1e

ne

es

is

1-

y

e

t

Organised by the German Cereals Research Association, the International Starch Convention will be held at Detmold, West Germany, from April 22 to 24. Lecturers will include Dr. G. Gilbert of Birmingham, who will review the action of air on solutions of starch, and Mr. A. W. Davies of London, who will speak on the vital gluten production and its commercial applications in Great Britain.

The annual conference of the Potato Research Association on April 25 and the annual conference of the International Starch Standardisation Association on April 25 will be held in conjunction with the Convention.

New patents service

Amended rules making minor changes in the arrangements governing patents applications and fees have been laid before Parliament by the Board of Trade. They include the introduction of a new service to the public by which information will be supplied as to whether any particular patent is in force on payment of a nominal fee of 1s. for the first patent and 6d. for each succeeding one.

This service will replace, and will, it is hoped, be an improvement on, the former annual publication of the "List of Patents in Force."

Griffiths Hughes' acquisition

The offer by E. Griffiths Hughes Ltd., to acquire the ordinary and "A" ordinary shares of 5s. each in J. C. and J. Field Ltd. at the price of 12s. 6d. per share, has been declared unconditional. Acceptances have been received from the holders of over 90% of each class of share.

Sulphuric acid in 1957

The National Sulphuric Acid Association Ltd. states that the trade consumption of sulphuric acid and oleum during 1957 was 2,371,060 tons. This excludes consumption by Government plants.

The soap, glycerin and detergents trades accounted for 98,589 tons, or 4·16% of the total. The drugs and fine chemicals trade consumed 19,098 tons, or 0·81% of the total.

Yorkshire Imperial Metals Ltd.

Yorkshire Imperial Metals Ltd. is a new company which represents the fusion of the copper and alloy tube, fittings and plate activities of the Yorkshire Copper Works Ltd. and of Imperial Chemical Industries Ltd. It disposes of assets worth about £18 million, including the former I.C.I. plants at Kirkby (Liverpool), Smethwick (Staffs), Landore (Swansea) and Dundee, and the former Yorkshire Copper plants at Leeds, Barrhead (Glasgow) and Castleford (Yorks). The registered offlice of Yorkshire Imperial Metals Ltd. is at Haigh Park Road, Leeds.

Company finance

Hickson and Welch (Holdings) Ltd. Tax on the profits of the Group for the year ended September 30, 1957, totalled £254,211, resulting in a net profit of £251,397 (£202,612).

Bowmans Chemicals Ltd. Profit for the year ending October 31, 1957, amounted to £18,536, after providing £13,771 for depreciation and £18,559 for taxation.

Eurochemic's plans

At the first meeting of Eurochemic, the European company for the chemical processing of irradiated fuels, steps were taken to start preparatory work for the construction of the plant and laboratories which the company will operate near the Nuclear Centre at Mol, Belgium. It was decided that a team of specialists to prepare the final plans of the plant and to start preliminary research would start work immediately at the Mol Centre.

immediately at the Mol Centre.
Chairman of the meeting was
Dr. Erich Pohland of the Federal
German Ministry of Atomic Affairs,
and the vice-chairman was Dr. Erich
Svenke, head of the Industrial Division
of the Swedish atomic energy corporation.

Eurochemic was set up in Paris on December 20, 1957, by 12 member countries of the O.E.E.C.

Berk House opened

F. W. Berk and Co. Ltd. have moved to their new head office at Berk House, Portman Square, London, W.1. Their industrial dryer division, powder metallurgy division and Micronizer plant department have also transferred to Berk House.

The heavy chemicals sales department will remain at Abbey Mills Chemical Works, London, E.15, and the Schori Division head office (metal and plastic coatings) at Brent Crescent, London, N.W.10.

British Pharmaceutical Conference—1958

The British Pharmaceutical Conference for 1958 will be held in Llandudno from September 15 to 19 inclusive.

The usual science sessions will be held for the presentation and discussion of papers. The conference executive has decided this year to offer authors the alternatives of submitting their science papers in one of two forms,

either (a) The familiar complete papers which should be as concise as possible—a maximum of 4,000 words is suggested,

or (b) A short communication.

This should not be longer than 1,000 words, or two pages of the Journal of Pharmacy and Pharmacology when complete with title, references, tables and figures, and it may be less.

It is intended to apply the same standards to both types of papers in assessing their suitability for acceptance.

Those who propose to contribute a paper should inform the Hon. Secretaries, 17 Bloomsbury Square, London, W.C.1 as soon as possible.

Unilever in Norway

Unilever and the Norwegian Company A/S Borregaard have reached agreement in principle on the sale of Unilever's interests in De Nordiske Fabriker De-No-Fa A/S and A/S Lilleborg Fabriker to Borregaard for the sum of £4.5 million in cash. De-No-Fa owns a factory in Norway for the hardening and refining of oils and fats, while Lilleborg owns oil and soap factories.

Petrochemicals exhibition

With "Petrochemicals in Everyday Life" as its theme, an exhibition was staged at Leeds on February 6 on the occasion of an open night held by the Yorkshire section of the Society of Chemical Industry and the Leeds area section of the Royal Institute of Chemistry.

Presiding was Prof. William Wardlaw, c.b.e., president of the Royal Institute of Chemistry, who introduced the guest speaker, Mr. R. C. Tarring, manager of detergents depart-

ment, Shell Chemical Co. Ltd.

Mr. Tarring spoke on "The Petroleum Chemist's Contribution to Home ' and illustrated his talk with slides and a film "New Detergents.".

Foam control idea wins £350

Glaxo Laboratories' suggestions award scheme has paid out its biggest individual award to date-£350-to Mr. D. C. Ryder, a process worker at the company's antibiotics plant at Ulverston, Lanes., for a suggestion for a method of electronic control of foaming during antibiotic fermentation which has led to a considerable saving in production costs.

Cosmetic science congress

The Society of Cosmetic Chemists of Great Britain will hold a Congress on Cosmetic Science from April 15-17, 1959, in London.

Its aim is to cover the practical rather than the academic side of the industry and the subjects to be discussed will come under the headings of analysis, manufacturing and engineering, and product evaluation.

Full details will be available from the Hon. Organiser, Dr. R. H. Marriott, County Laboratories, Ltd., County Buildings, Honeypot Lane, Middlesex, before June 1, 1958.

German agency for Jacobson Van Den Berg

Jacobson Van Den Berg and Co. (U.K.) Ltd. have been appointed exclusive United Kingdom representatives of Dr. Theodor Schuchardt G.m.b.H., of Munich, suppliers of scientific preparations, organic reagents, indicators, microscopic stains, aminoacids, and fine chemicals for research.

More approved names for drugs

A supplementary list of approved names for drugs has been issued. These names are devised or selected by the British Pharmacopæia Commission, and the intention is that if any of the drugs to which these names are applied should eventually be described in the B.P. the approved name should be its official title.

The names appearing in the second column of the following list include some registered trade marks.

Approved name

Approve name

Alphacetylmethadol.

a - 3 - Acetoxy - 6 - dimethylamino - 4 : 4 - diphenylheptane

O-Acetate of a-6-dimethylamino-4 : 4-diphenylheptan-3-ol

ALPHAMETHADOL

a - 6 - Dimethylamino - 4 : 4 - diphenylheptan - 3-ol

AZACYCIONOL

AZACYCLONOL Diphenyl-(4-piperidyl)methanol Frenquel is the hydrochloride

*Betacetylmethadol β - 3 - Acetoxy - 6 - dimethylamino - 4 : 4 -

β - 3 - Acetoxy - 6 - dimethylamino - 4 : 4 -diphenylheptane O-Acetate of β-6-dimethylamino-4 : 4-diphenyl-

O-Acetate of \$-6-dimethylamino-4; 4-diphenyl-heptan-3-ol
*BETAMETHADOL
\$-6-Dimethylamino-4; 4-diphenylheptan-3-ol
†BROMODIPHENHYDRAMINE
2 (4 - Bromodiphenylmethoxylethyldimethyl-amine
4-Bromo-a-phenylbenzyl 2-dimethylaminoethyl-other ether

Ambodryl CHLOROTHIAZIDE 6 · Chloro · 7 · sulphamoylbenzo · 1 : 2 : 4-thiadiazine 1 : 1-dioxide Chlotride; Diuril; Saluric

Choloride; Diuri; Salure
Choline Fakophyllinate
Choline salt of theophylline
Choledyl
CYCLOPRENOL
68-Hydroxy-3: 5-cyclopregnan-20-one
Neurosterone
CYCLOSERINE
B. 4. A minegovayolid, 3 one

D-4-Aminosoxazolid-3-one Seromycin DESERPIDINE 11-Demethoxyreserpine

Harmonyl *DESOMORPHINE

*DISOMORPHINE Dihydrodeoxymorphine Dihydrodeoxymorphine DIMEPHEPTANOL 6 - Dimethylamino - 4 ; 4 - diphenylheptan - 3 - ol Methadol DIPHENYLPYRALINE Diphenylmethyl 1 -methyl-4-piperidyl ether Histryl is the hydrochloride

*ETOXERIDINE Ethyl 1 - [2 - (2 - hydroxyethoxy)ethyl] - 4 -phenylpiperidine-4-carboxylate

HEXOCYCLIUM METHYLSULPHATE OCYCLIUM METHYLSULPHATE
- (2 - cyclo Hexyl - 2 - hydroxyphenethyl) -4: 4 - dimethyl-piperazinium methylsulphate

Tral
DROMORPHONE
Dihydromorphinone
Dilaudid is the hydrochloride

MANNOMUSTINE

1:6 - Di - (2 - chloroethylamino) - 1:6 - dideoxy-n-mannitol

Degranol is the dihydrochloride

METHYLDESORPHINE 6-Methyl-Δ-deoxymorphine

Dihydromethylmorphinone

Dihydromethynnorphine Myristyl ester of benzylmorphine Nandrodons 178-Hydroxy-19-norandrost-4-en-3-one 19-Norandrostenolone 178-Hydroxyoestr-4-en-3-one Durabolin is the phenylpropionate

OXYCODONE

Dihydrohydroxycodeinone

Eucodal is the hydrochloride

YMORPHONE
Dihyodrodhyrxymorphinone
Dinyodrodhyrxymorphinone

Diffyourously and the PROMAZINE 10-(3-Dimethylaminopropyl)phenothiazine Sparine is the hydrochloride PROQUAMEZINE 10 - (2:3 - Bisdimethylaminopropyl)phenothiazine

THALIDOMIDE

a-Phthalimidoglutarimide
Distaval

THEBACON Acetyldihydrocodeinone *TRIMEPERIDINE

1:2:5 - Trimethyl - 4 - phenyl - 4 - propionyl-oxypiperidine

Narcotic substances which fall under Inter-tional Conventions and are not available as national Conventions therapeutic agents,
† Replaces the Approved name bromazine from

May 1, 1958. ‡ Replaces the Approved name methadol.

Industry in Queensland

Under the leadership of the Queensland deputy Premier and Minister for Labour and Industry, Mr. K. J. Morris, the Queensland Promotion delegation will arrive in London in early April for a visit lasting several They will be visiting some of the main industrial centres in the United Kingdom with a view to attracting more British industry to Queensland.

Anyone wishing to meet the delegation should write to the Agent-General at 409 and 410 Strand, London, W.C.2.

Pfizer's expansion

Pfizer Ltd. plan to open new laboratories and extend existing ones at their Sandwich, Kent, factory. considerable sum is being spent on independent fundamental research projects in addition to opening new development and production-control laboratories.

Among the senior research staff appointed by Pfizer Ltd. are: Dr. R. J. Boscott, formerly lecturer in endocrinology at Birmingham University; Dr. H. H. R. Reinert, formerly lecturer in the Pharmacological institute of the Free University, Berlin; Dr. P. B. Stones, for the past five years lecturer in bacteriology at Manchester University; and Dr. R. E. H. Swayne, a research chemist, who will be research liaison officer.

A research building which is to be erected near the American parent companys' factory at Groton, Connecticut, will have facilities for chemical, medical and fermentation research.

Chemical plant operators

Mr. Malcolm George Gell, an employee of Bleasdale Ltd., manufacturing chemists of York, has obtained first place in the final examinations of the City and Guilds of London Institute in chemical plant operation, 1957. He has been awarded the Institute's silver medal, and presented by the Association of Chemical and Allied Employers with a gold watch, in recognition of this distinction.

After a successful period as a parttime student in the intermediate course at York Technical College, Mr. Gell pursued his final studies in the short sandwich course at the West Ham College of Technology, London.

The West Ham sandwich scheme is conducted over two periods of fulltime study, each of ten weeks duration, held in consecutive years.

People



Interble as

eensr for J. otion n in veral ne of the

to to

ega-

ent-

and,

ora-

at

A

on

arch

new

trol

taff

Dr.

Jni-

erly

sti-

lin:

live

at

R.

ist.

be

ent

eti-

cal.

m-

ıu-

188

m-

of

ant

led

nd

m-

old

is-

te

e,

in

st

is

11-

n,

st

Mr. W. Carter.



Mr. S. L. Waide.



Mr. D. P. Hickey.



Mr. N. J. Travis.



Mr. M. J. Howard.

Benger Laboratories Ltd. have appointed Mr. D. P. Hickey, their northern regional manager in the U.K., to the position of acting promotion manager for continental Western Europe.

Mr. M. J. Howard, A.C.A., F.C.W.A., who has been chief accountant to Price's (Bromborough) Ltd. since last May, has been appointed to the board of the company. His place as accountant has been filled by Mr. R. Audas, A.C.W.A.

Mr. W. Carter has been appointed a director of Albright and Wilson Ltd. He joined the company in 1940 and, after filling a succession of positions on the management side of the company, was appointed the first managing director of the operating company, Albright and Wilson (Mfg) Ltd., on its formation in 1957.

Borax Consolidated Ltd. have appointed Mr. N. J. Travis as technical director and director responsible for research, development and production. He was formerly managing director of I.C.I.'s subsidiary company, British Visqueen Ltd., engaged in association with the Visking Co. of Chicago in the development, manufacture and sale of polythene packaging film.

Mr. S. L. Waide has been appointed to the board of Newton Chambers and Co. Ltd. He joined the company as a local director and general manager of the Chemicals Division in July 1955, and since September 1956 has been assistant managing director in complete charge of that division, which is concerned with the manufacture and marketing of the company's Izal products. Before joining Newton Chambers he was works director with T. J. Smith and Nephew Ltd.

Cyclo Chemicals Ltd. have appointed Mr. D. Bass, B.SC., as U.K. sales manager for their range of fatty alcohols and derivatives. He was previously with Armour and Co. Ltd., and also has had experience in the cosmetic and pharmaceutical industries.

G. D. Searle and Co. Ltd. have appointed Dr. D. G. Anderson, B.A., to take charge of their chemical manufacturing.

The Distillers Co. (Biochemicals)
Ltd. have appointed Mr. C. Birkett
and Mr. G. V. Hopwood marketing
manager and assistant marketing
manager respectively.

Mr. W. M. Clayson, a director of Allen and Hanburys Ltd., is making an extensive overseas tour, visiting Australia, New Zealand, Fiji and Canada.

Mr. M. de Boissieu, Secretaire Général of Société Minière et Métallurgique de Penarroya, has joined the board of H. J. Enthoven and Sons Ltd. Mr. F. Brearley, Secretary of the company, has also been appointed a director.

Mr. Hugh H. Baird has resigned his directorships of Baird and Tatlock (London) Ltd. and Hopkin and Williams Ltd., and has sailed for Australia with his family. In Australia he intends to build plastic hulls for small marine craft.

Marchon Products Ltd. have appointed as sales controllers Mr. M. Dufaye and Mr. A. Taylor. Mr. M. Dufaye previously held the position of export sales manager and Mr. Taylor that of technical service manager. Mr. G. W. Pekarek remains home sales manager and Mr. D. Dine now assumes the position of export sales manager.

The Chemists Federation has elected Mr. Frank E. Mellor its President for 1958. Mr. Mellor is a home sales manager of Evans Medical Supplies Ltd., and has been a member of the Council of the Chemists Federation for eight years. He is also a member of the Propaganda Committee and in 1957 was chairman of the Finance and General Purposes Committee.

He has been with Evans Medical's staff for over 30 years.

Owing to ill-health Mr. F. W. Rumball has retired from his position as works director of Flexile Metal Co. Ltd., but he will continue his long association with the company as outside consultant. Mr. E. A. Thorne, formerly works manager of Flexile's Holloway factory, has been appointed general works manager of the company.

Mr. L. V. Duggan, British West Indies representative for Evans Medical Supplies Ltd., has returned to the company's head office on completion of his tour of duty. After leave he will travel to New Zealand to represent the company's interests in conjunction with Mr. E. P. Lescher, their senior representative there.

Dr. Vannevar Bush has been elected chairman of the board of directors of Merck and Co. Inc., New Jersey, parent organisation of Merck Sharp and Dohme International. He succeeds George W. Merck, who died in November 1957.

Obituary

Mr. George F. Merson, F.R.S.E., F.P.S., founder of the surgical suture business now known as Ethicon Ltd., died on February 20. He was born in Fraserburgh in 1866 and was apprenticed in the pharmacy of Robert Burnett of Fraserburgh. He returned to Edinburgh in 1910 when he joined the firm of J. F. MacFarlan.

When the war started it was found that Britain had been dependent for its supplies of surgical sutures and ligatures entirely upon German sources and Mr. Merson was approached by the Department of Health for Scotland to see whether it would be possible to start a British industry.

From modest beginnings he moved to a small factory in Meuse Lane, Edinburgh, in 1915 and continued there until he moved to St. John's Hill, The Pleasance, Edinburgh, where a factory of considerable size was developed.

In 1937 he retired from business and this was continued by Dr. Eldred Holder until finally it passed in 1947 into the hands of Ethicon Ltd.

News from Abroad

AUSTRALIA

New polythene plant

The £2,250,000 polythene plant of Imperial Chemical Industries of Australia and New Zealand Ltd., which commenced operations recently, will ultimately save Australia some £2 million a year in import expenditure. This plant is highly mechanised, employing only 100 men. Part of the plant came from overseas, but about half the capital cost was spent in Australia.

NEW ZEALAND

Chemical imports

Licences for importation into New Zealand of the following goods will be granted in amounts applied for:

Acetic acid, tartaric acid; acetone, amyl alcohol, butyl alcohol, bromine, carbon bisulphide, chlorides of carbon, catechu, cochineal, formic aldehyde, fusel-oil, gallnuts, iodine, liquorice in blocks of minimum 7 lb. net, phosphorus, pyridine, quinine and salts of quinine, saffron, unground tumeric, commercial wood naphtha, nicotine and its salts; barytes; bottling wax; calcium carbide; carnauba and ouricuri wax; chloroform, ethyl ether, anæsthetics, antiseptics, penicillin; cream of tartar and substitutes; pine tar, dextrine.

Cresylic acid, phenol, monochlorxylenol, corrosive sublimate tablets, sodium orthophenylphenate, quaternary ammonium compounds; crude petroleum, crude residual oil, once run shale oil, crude distillates of petroleum; cut corks, bungs; dental casting powders composed mainly of plaster of paris.

Drugs, chemicals, etc., entered to be warehoused in a manufacturing warehouse, and those specially suited for use as culture media; crude drugs not powdered and unsuited for use as foods; dyeing materials other than manufactured dyes.

Synthetic essences; essential oils (including hop-oil).

Filter paper, filter pulp; filters for purifying water supplies; chemical fire extinguishers (other than hand types); gases, liquefied or compressed (excluding carbon dioxide or carbonic acid gas); graphite and plumbago in powder or flake form; gums and resins, fused; natural gums and resins, esterified; crude gypsum.

Insulin and substitutes; naphthalene, crude or refined; other oils, including mineral lubricating oil, mineral oils mixed with vegetable oils, etc., mineral oil specially suited for medicinal purposes, as approved oxides of anti-

Paints and colours, dry (excluding

kalsomine, distempers and similar preparations and cement-based paints); plastic moulding powders (including synthetic resin moulding powders); black printing ink in packages containing less than 1 cwt.; refined mineral oils not exceeding 0.860 at 60°F. in specific gravity; rosin; saccharin; gauzes, cotton wool, antiseptic dressings; crude tanning materials; turpentine and substitutes; and X-ray tubes.

KENYA

U.S. will buy complete crop of pyrethrum

U.S. buyers have offered to import nearly all supplies of pyrethrum from Kenya as from this year. These will be in the form of pyrethrum extract, rather than the baled flowers. At present America takes about 3,200 tons of Kenya's annual output of 5,500 tons. Plans for an extraction plant are well advanced and trial production should start towards the end of the year, with full production commencing in mid-1959.

NORWAY

Chemical engineering exhibition in Oslo

Machinery, equipment and apparatus used in the chemical, electrochemical and electrometallurgical industries will be featured at the International Chemical Engineering Exhibition in Oslo in October.

The first exhibition of its kind to be held in Scandinavia, it will occupy 76,000 sq. ft. of floor space. Several study conferences are being arranged.

Further information can be obtained from the Secretariat of the Exhibition, Studieselskapet for Norsk Industri, Forskningsveien, 1, Blindern, Oslo.

BURMA

Soap manufacture with Unilever

Plans are in progress for the establishment of a joint venture to be known as Burma Unilever Ltd. between Unilever Ltd. and the Union Government for the manufacture of soap. The Burmese Industrial Development Corporation would hold 25% of the shares. The United Kingdom firm is said to have been given a 15-year guarantee against nationalisation with facilities for the import of equipment and raw materials and remittance rights. A site for the factory has been made available on the Hlaing river above the Government jute mill at Thamaing near Rangoon on a 30-year lease. development of the site is to be undertaken by the Government and the factory is expected to go into production in 1959. Initially the production aimed at is 5,000 tons of soap a year against Burma's present annual consumption of 18,000 tons.

Over-production of yeast tablets?

The Burma Pharmaceutical Industry is now producing something like a million yeast tablets a day in accordance with the Prime Minister's scheme to manufacture yeast tablets in order to correct the dietary deficiency of the Burmese people. It is reported that difficulties are being experienced in distributing such large quantities of this product and in persuading the people to consume it, and one authority has suggested that the production of yeast tablets be cut to one-sixth of the present rate.

JORDAN

Potash plans

A British firm, L. H. Manderstam and Partners Ltd., have been awarded a contract for the erection of a potash plant in Jordan.

Potash was recovered by the solar evaporation method in Palestine from 1930 until 1948, when one of two plants of Palestine Potash Ltd., at the north end of the Dead Sea, was destroyed. The other plant, located at the south end of the Dead Sea in what is now Israel, has been rehabilitated, modernized and has been producing potash from brine since mid-1955. Together, the two plants were producing an estimated 102,635 tons of fertiliser grade potassium chloride in 1957.

In rebuilding the north plant, it has been decided to abandon the old process and to adopt whichever one is best suited to present conditions. The first phase is, therefore, to erect and operate a pilot plant in order to obtain the necessary basic data for the design of a full-scale plant.

This is the second recent contract secured by Manderstam in Jordan. The other is with the Jordan Phosphate Mines Co., for whom they are drawing up recommendations relating to the erection of a superphosphate factory.

UNITED STATES

Glycerin awards

Dr. James Tullis, of the Blood Characterisation and Preservation Laboratory, Jamaica Plain, Massachusetts, is the winner of the 1957 Glycerin Research awards, sponsored by the Glycerin Producers' Association, New York. He has been awarded \$1,000 and a plaque for his work in the

giveerin freezing of human blood for long-time preservation.

Second prize of \$300 and a certificate went to Dr. Guido Marinetti, for his studies on the fractionation and purification of phospholipids, glycerin derivatives found in all living cells. He is assistant professor of biochemistry at the University of Rochester School of Medicine and Dentistry.

the

pro-

Dro-

can

nual

In-

ning

in

er's

lets

de-

t is

eing

rge

in

it.

hat

be

am

ded

ash

lar

om

wo

at

vas

ted

in

lit-

ro-

id-

ere

ns

ide

old

ne

ns.

ect

to

or

et

n. te

ng

he

od

on

u-

in

he

W

no

he

st

Two Canadian research workers. Dr. Henry R. Sallans and Dr. C. C. Youngs, of the Prairie Regional Labor-National Research Council, Saskatoon, Saskatchewan, shared third prize of a \$200 honorarium and a certificate for their work on the glyceride composition of fats.

SOUTH AFRICA

Essential oil industry planned

Research by the Council for Scientific and Industrial Research's National Chemical Research laboratory, in collaboration with the Department of Agriculture, may lead to the establishment of an essential oil industry in the Union, stated the Council. South Africa imports annually about £500,000 worth of essential oils for use in perfumes, disinfectants, deodorants, toothpastes and for flavouring foodstuffs such as meat products, confectionery and alcoholic and soft Many of these oils are exdrinks. tracted from plants that can be grown in South Africa.

In the joint programme, the Department of Agriculture will introduce proved types of plants with the best methods of cultivating them, while the National Chemical Research Laboratory will investigate methods of extraction and determine the yield and quality of the oils. The growing of the plants, it is stated, may offer an alternative to farmers faced with overproduction of some staple crops. The establishment of a "cottage-type" industry to produce these oils in the Native Reserves, where labour costs are low, might help in the development of these territories. Another possibility is that essential oil plants could be grown on poor soil to retard soil erosion and partly pay

Bantu pharmacists

for conservation schemes.

Government plans to train Bantu pharmacists have been outlined by the Minister of Native Affairs. He said that after discussions between urban local authorities, the Department of Health, the Department of Education and the South African Pharmaceutical Society, the Government had decided to make a survey to determine how many Bantu could be employed as chemists in hospitals and in trading stores in Native areas.

The survey would be submitted to the Department of Native Affairs,



In the grounds of the President's palace at Rangoon the President of the Union of Burma, U Win Maung and his wife, talk to Mr. Raphael Simons, who joined the staff of Evans Medical Supplies in the setting up of the Burma Pharmaceutical Industry. Mr. Simons is due to return to England shortly.

which would consider the appointment of a committee to make recommendations on training, conditions of apprenticeship, a guarantee against the employment of Bantu pharmacists in exclusively European areas and the number to be trained annually.

TRADE MARKS

APPLICATIONS

Cosmetics and Toilet Preparations

BLUE AND GOLD 4711 COLOGNE ON RHINE.—703,168. TOSCARA.-7 70,810. Eau de Cologne- and Parfümerie-Fabrik, Glockengasse No. 4711, Gegenüber der Pferdepost von Ferd. Mülhens, 4711. JEUNESSE.—765,596. Gala of London Ltd.

MINERS TOP TEN. — 767,590. MINERS NICE 'N' FRESH.—767,845. MINERS SOFT 'N' SMOOTH.—767,846. MINERS ROUND THE WORLD.— 765,320. Henry C. Miner Ltd. VERS TOI.—766,063. Worth Parfums.

ARIEL. -770,739. Reckitt and Colman

Ltd. MYSTERE.—768,618. Kayser Bondor

BONAT.—770,128. Maurice H. Baker. NEUTRAMOUSSE.—767579. Perma Société Anonume.

ACTORÉNE.-769,553. Eugene Ltd. SEVENTH WAVE .- 770,471. Boots Pure Drug Co. Ltd.

FLASHPOINT.-770,493. Gala of London Ltd.

- B770,525. SIMPLON. Greenford Chemicals Ltd.

CENTREX. -764,798. Walkers (Century Oils) Ltd. VIVA.—766,816. Henry C. Miner Ltd.

Pharmaceuticals

ANACORTOL.—764,659. BENACOR-764,660. Parke, Davis and Co. TRANSROID .- 765,644, Trans Chemie,

NOVERIL.-769,067. Dr. A Wander, S.A.

CE-COBALIN.-770,392. Paines and Byrne Ltd.

ALKA-DONNA. - 770,519. Laboratories (Southern) Ltd. CALCENUM. — 765,332. Chimique Belge S.A. Union

PENTASCODIN. — 767,535. Glaxo Laboratories Ltd.

CARTRAX. -769,876. Chas. Pfizer and Co. Inc.

DELTA-BUTAZOLIDIN. — 769,074. J. R. Geigy S.A. (J. R. Geigy A.G.). BROMOVALINE.—770,126. Victoria

Laboratories Ltd. GELCOSPONGE.-770,780.

dated Chemicals Ltd.
RENGASIL.—770,826. Ciba Ltd.
MEPEDOXIN.—770,844. British Drug Houses Ltd.

PECTOGENE. -770,886. Ltd.

ALEVERGEN. -770,895. Imperial Chemical Industries Ltd.

VETRETTES.—764,443. QUADRI-GEN.—764,662. Parke, Davis and Co. TIMESPAN.—769,325. Roche Products QUADRI-

ANDROMEXINOL.—770,992. Nurace Surgical and Chemical Co.

VIRIBA.—771,204. Modern Health Products Ltd. PROPERDONAL.-765,676. Labora-

toires Millot. MYANONE.-767,117. Howard Lloyd

and Co. Ltd. PHRENOTROPIN.-B767,820.

erial Chemical Industries Ltd. SATARAXOID .- 768,100. Chas. Pfizer and Co. Inc. ONYCHOPHYTEX.—768,435. Wynlit

Pharmazeutische Produkte A.G. MITSUBISHI.—768,862. Mitsubishi

Shoji Kabushikikaisha. ENAVID .- 769,389. G. D. Searle and

FOLGEN. -769,758. Genatosan Ltd. CARDRASE.—770,294. Upjohn of

England Ltd. AQUATANE. - 770,385. Chemical Industries Ltd.

CAMPHIDONIUM.—768,475. Dr. Karl Thomae G.m.b.H. SUSTAMED 2-12.—769,402.

Research Corporation. PYTHON -769,997. Kenneth W. Hole. THRU.—B765,086. Rexall Drug Co. APIDYK.—766,105. Dykinson Sociedad

Limitada. CROLAX.-769,427. Crookes Labora-

ROBALATE.—770,654. ROBITUS-SIN.—770,655. A. H. Robins Co. Inc. TENSOPAX.—769,502. Victoria Lab-

oratories Ltd. COLAKTOL. -- 768,852. Deiglmayr Chemische Fabrik, Nachfolger.

Antibiotics

ORMOBIOTIN .- 765,214. Ormond Laboratories Co.

HUMATIN .- 766,547. Parke, Davis PENTASCODIN. — 767,535. Glaxo

Laboratories Ltd. SOFRAMYCIN.-770,081. Les Labora-

Technical Press Review-March

Corrosion Technology. — Metal Spraying; The "Serseal" Process for Fume Prevention; Corrosion of Type Metal; Application of Plastic Tape to Natural Gas Pipeline; O.C.C.A. Exhibition Preview.

Chemical and Process Engineering.—Petroleum Chemical Activities in Britain; Metallurgy; Canada's Big New Aluminium Plant, Art of Chemical Plant Management-2: Chemical Engineering in the Atomic Energy Industry.

Petroleum.—Petroleum Development in South America: The Oil Geology of South America; Immersion Viscometer; Secondary Production Methods; The Palembang (Sumatra) Refinery of the Standard Vacuum Oil Company.

Atomics. - Hydrogen Power -Britain is Nearest; Problems of Thermonuclear Power; A Survey of Controlled Fusion; Controlled Fusion Research in France; Nuclear Fusion in Germany; Blind River Uranium Field of Canada—2; PLUTO in Action; Japan's First Reactor; Around the Sites Berkeley and Chapeleross.

Paint Manufacture. — O.C.C.A. Exhibition: Specific Surface and Pigment Volume as Factors in Dispersion; Mica in Emulsion Paints; Blushing of Nitrocellulose Laquers.

Food Manufacture. - Mechanised Bakery Review; Annual Reviews-Milling, Baking; Electronic Control of Soup Formulation; Problems and Perspectives in Malt Vinegar Brewing.

World Crops.—Review of Cereals and Grain Handling; Rice Destruction by Crabs; Grain Drying; Cereal Production in Britain; Maize in the U.S.A.; Choice of Seed.

Automation Progress.—Review of Machine Tools; A Transfer Line for Differential Carriers; A New Concept of In-line Transfer; Numerical Control in Action; A New Semi-conductor Amplifier; Reading Machines.

Dairy Engineering. - Mechanisation in Cheese-making; New Cleaning Technique for Centrifugal Plant; Detergent Recovery Methods-2.

Fibres.-Review of Dyeing and Dyeing Machinery; Dyeing Dynel; Dyes and Dyeing Techniques; Turbo Dyeing Apparatus; Synthetic Resins in Textile Manufacture-2: Textile Industry in Israel-1.

NEW PATENTS

COMPLETE SPECIFICATIONS

Dyestuffs

Process for preparing oxidation dyes on the fibre. A.C.N.A. Aziende Colori Nazionali Affini. 787,357.

Process for dyeing cellulosic textile materials with vat dyestuffs. Imperial Chemical Industries Ltd. 787, 343.

Anthroquinone dyestuffs and their use. Geigy A.G. 787,299.

Dyeing natural and synthetic polyamide fibres. Badische Anilin and Soda-Fabrik .A.G. 787,378.

Mixed cobaltiferous complexes of monoazo-dyestuffs and process for their manufacture. Ciba Ltd. 789,002.

manufacture. Ciba Ltd. 789,002.

Monoazo dyestuffs and their metal complex compounds. Farbenfabriken Bayer A.G. 789,126.

Dyestuffs of the benzotrifluoridemonoazo-benzene series. Imperial Chemical Industries Ltd. 789,025.

Production of dvestuffs on the fibre. Farbenfabriken Bayer A.G. 789,310.

Antibiotics

Compounds of the isonicotinylhydrasone of the sulphonyl-benzaldehyde with antibiotic bases and process for their produc-tion. Laboratoires Français de Chimiotherapie. 789,683.

Antibiotic compositions. Pfizer and Co. Inc. C. 787.316.

Production of tetracycline by fermentation. Bristol Laboratories Inc. 787,368.

Manufacture of veterinary preparations containing penicillin. Glaxo Laboratories

Purification of basic antibiotics using ion-exchange resins. Pfizer and Co. Inc.

Stabilised penicillin salts. Lepetit Soc.

per Azioni. 792,027.
Antibiotics. Bristol Laboratories Inc. 790,521.

Antiseptics

Antiseptic preparations. S. Johnston.

Germicidal compositions. Carlen Corporation. 792,175.

Antiseptic articles and methods of producing them. Gallowhur Chemical Corporation. 792,050.

Vitamins

Methods of producing an isomerisation product of Vitamin D or an ester there-of. N/V Philips' Gloeilampenfabrieken.

Carotenoid compounds and their manufacture. Hoffmann-La Roche and Co. A.G 790,614, 790,615 and 790,616.

Steroids

Oxidation products from compounds of the steroid series and process for making them. Ciba Ltd. 792,803.

Synthesis of steroids. Olin Mathieson Chemical Corporation. 792,223. Steroid compounds. Merck and Co. Inc.

Preparation of 9β 11β-oxide steroid compounds. Merck and Co. Inc. 790,446. Steroids and the preparation thereof.

Upjohn and Co. 790,452. Manufacture of compounds of the suprarenal cortex hormone series. Ciba Ltd. 791,914.

Pharmaceuticals

Anticonvulsant pharmaceutical composition. Abbott Laboratories. 787,156.
Pharmaceutical compositions. Imperial

Chemical Industries Ltd. 788,739.
Injectable solutions of digoxin. Wellcome Foundation Ltd. 788,698.

Alkaloid derivatives. Laboratoires Gobey. 789.870.

Process for producing acridine compounds. Parke, Davis and Co. 790,696.

Detergents and soaps

Detergent preparations. Unilever Ltd. 789,032

Synthetic organic detergent composition. Colgate-Palmolive Co. 788,681.

Cleaning compositions for surfaces contaminated with heavy metal compounds. Brentford Soap Co. Ltd. 790,306.

Fertilisers

Diammonium phosphate fertiliser production. Dorr-Oliver Inc. 789,747.

Composition for temporarily sterilising soil. Stauffer Chemical Co. 789,690.
Process for drying moist salt mixtures,

produced in the manufacture of compound fertilisers and improved salt mixtures prepared by such a process. Victor Gewerkschaft. 789,978.

Urea-formaldehyde resin fertiliser compositions. Fisons Ltd. 789,075.

Fertiliser distributor. T. H. R. Kramer and J. N. Folkerts. 788,733.

Chemical Engineering

Homogenising mills. Apex Construction Ltd. and W. C. Peck. 789,881.

Device for atomising liquids. B. Lataste.

Portable water-distillation apparatus. Lea Bridge Industries Ltd. 790,752.

Apparatus for dispensing a spray nedium. Fisons Pest Control Ltd. medium. 787,250.

Miscellaneous

Concentration of protein of fish. Crookes Laboratories Ltd. 789,812.

Syringe ampoules. Penicillin-Ges. Dauelsberg and Co. 789,926.

Removal of chlorine from chlorine-ater solutions. Hooker Electrochemical water solutions. Co. 787,306.

Stabilisation of hydrogen peroxide. Laporte Chemicals Ltd. 788,951.
Stabilising and softening of the halogen-

containing organic compounds, and cured products prepared therefrom. Naamlooze Vennootschap de Bataafsche Maatschappij. 788,806.

Glass aerosol containers and method of

making same. J. F. West. 789,347.
Derivatives of naphthalene and the manufacture thereof. Wellcome Foundation Ltd. 789,561.

Phosphate and salts thereof and the manufacture of same. Roche Products. 789.563

Purification of elementary boron. Borax Consolidated Ltd. 789,403.

anufacture of polyhydroxy compounds. Celanese Corporation of America. 780.346.

Synthetic resins. Röhm and Haas Ges. 783.417.

erines. Parke, Davis and Co. 789,574. Pentacyclic ketone and process for making it. Ciba Ltd. 789,357.

Preparation of mercury-containing fungicides and compositions containing them. Olin Mathison Chemical Corporation. 789,432.

Production of polymeric materials. Imperial Chemical Industries Ltd. 756,371. Catalyst recovery process. Chemical Industries Ltd. 756,679.

Conversion of sulphur dioxide to sulphur trioxide. Imperial Chemical Industries

Ltd. 756,683.

teroid

0,446.

the

Ciba

com-

perial

lcome

obey.

com-

,696.

Ltd.

posi-

con-

nds.

pro-

sing

und ires

ctor

om-

mer

ion

ste.

us.

td.

kes

es.

al

€.

n-

ed

m

of

7-

r

t

Ltd. 750,088.

Isocyanate-modified polyester rubbers.
Imperial Chemical Industries Ltd. 756,748.

Production of 1-methyleyclohexene.
Imperial Chemical Industries Ltd. 756,751. Coating compositions. Imperial Chemi-

cal Industries Ltd. 756,859.
Screening of granular or particulate materials. Imperial Chemical Industries Ltd. 756,971.

Substituted piperidines and process of making them. Ciba Ltd. 756,713. Manufacture of dioxo-pyrrolidines. Ciba

Ltd. 756,929.

Purification of organic nitriles. du Pont de Nemours and Co. 756,242. Purification of organic nitriles. E. I. du Pont de Nemours and Co. 756,243.

Polymerisation of ethylene. E. I. du Pont de Nemours and Co. 756,813.

Polymeric materials and methods of preparing them. E. I. du Pont de Nemours and Co. 757,043.

Polymeric organo-titanium compounds. E. I. du Pont de Nemours and Co. 757,190. Process for the production of oxygencontaining hydrocarbon compounds. Metallges. A/G. 756,223. Method for the utilisation of manganese

ore for the production of pure manganese sulphate and the regeneration of the sulphate spent liquid from electrolytic manganese and manganese dioxide baths. Council of Scientific and Industrial Research. 756,362.

Production of esters of gamma-ketopimelic acid. Monsanto Chemical Co. 756,483.
Process for the production of ammon-

ium carbamate. Montecatini Soc. Generale l'Industria Mineraria e Chimica. 757,016.

Sulphodicarboxylic acid compounds. Farbenfabriken Bayer A.G. 757,038.

Oxidation of b-isopropylnaphthalene to

b-isopropylnaphthalene hydroperoxide. Distillers Co. Ltd 757,164.

Process for purifying acrylonitrile from acetylene hydrocarbons. Montecatini Soc. Generale per l'Industria Mineraria e Chimica. 758,577.

Production of titanium dioxide pig-

ments. E. I. du Pont de Nemours and Co.

Sulphur-containing compounds. Boots Pure Drug Co. Ltd. 758,827; 758,926.

Organic sulphur-containing compounds.
Boots Pure Drug Co. Ltd. 758,658.
Preparation of carbon monofluoride.
Imperial Chemical Industries. 759,173.

Diuretic acting xanthine derivatives. J. R. Geigy A/G. 759,174.

New patents are from the Journal of Patents; and new trade marks are from the Trade Marks Journal. In each case permission to publish has been given by the Controller of Her Majesty's Stationery Office. Each of the publications mentioned is obtainable from the Patent Office, 25 Southampton Buildings, London, W.C.2.

NEW COMPANIES

These particulars of new companies have been extracted from the daily register of Jordan and Sons Ltd., company registration agents, Chancery Lane, Loudon, W.C.2.

Sprinkleen Ltd. 4.12.57. 3/6 Alfred Place, Bloomsbury, London, W.C.1. Manfrs. of and dlrs. in soaps, detergents, etc. £5,000. Dirs.: N. R. and B. Chinn.

Formula 16 Ltd. 15.1.58. 11 Hertford Street, London, W.1. Chemists and druggists, etc. £100. Subs.: Aileen Porterfield and Jeanne Turney.

Gentlemen's Requisites Ltd. 16.1.58. 30 Craven Street, London, W.C.2. Chemists and druggists, etc. £100. Dirs.: D. B. R. and B. W. A. Smith.

English and Worringham Ltd. 17.1.58. To take over businesses of J. English and Co. Ltd., Edward Worringham and Co. Ltd. and Alfords (Lubricants) Ltd., and to carry on bus. of dlrs. in and mfrs., refiners, blenders, importers and exporters of oils, greases, fats, glycerin, chemicals, etc. £75,000. Dirs.: F. W., A. F., and F. L. Bristow, and W. G. Canning. 59/67 Gresham Street, London, E.C.2. C. Atkinson (Chemists) Ltd. 17.1.58.

Room 406 High Holborn, London, W.C.1. £5,000. Dirs.: C. Atkinson, 20 The Grangeway, Grange Park, London, N.21, and D. Atkinson.

Cullen and Hennings Ltd. 21.1.58. 48, Lower Street, Pulborough, Sussex. Pharmacists, chemists, druggists, opticians, drysalters, oil and colour men, etc. £500. Dirs.: S. W. and Mrs. D. E. Cullen and C. T. and Mrs. R. Hennings.

Pharmacy Products (Overseas) Ltd. 20.1.58. 23 Bloomfield Street, London Wall, London, E.C.2. Importers, mnfrs. Wall, London, E.C.2. Importers, mnfrs. of and dlrs. in medical supplies, etc. £100. Dirs.: Dr. H. E. J. M. and Mrs. M. A. M. Meunier, 26 Cours Berriat, Grenoble, France, and E. W. Spicer. B.C.H. Ltd. 21.1.58. 27 Southampton

B.C.H. Ltd. 21.1.38. 27 Southampton Row, London, W.C.1. Chemists and druggists, etc. £200. Dirs.: T. Barton, Doris M. Carr and J. E. Smith. Linsall Ltd. 22.1.58. St. Annes Bldgs., 349 Clifton Drive North, St. Annes-on-Sea. Chemists and druggists, etc. £400. Dirs.: C. H. and Mrs. E. M. Tomlinson, and A. and Edith M. G. Arnall.

Lactran Ltd. 24.1.58. Chemists, drug-gists, etc. £100. Subs.: Jean and T. A. Herbert, 156 Strand London,, W.C.2.

Hormo-Pharma (Sales) Ltd. 13.1.58. Mfrs. and suppliers of pharmaceutical products ed on by Hormo-Pharma Ltd., etc. £2,000. Subs.: Vera C. Ullmer and Joan O. Bryant, 73 Basinghall Street, London, E.C.2.

T. D. Richards and Son Ltd. 13.1.58. 27 Birmingham Street, Oldbury. To take over bus. of a pharmaceutical chemist ed on at Oldbury, Wores., by Tegid D. Richards, etc. £5,000. Dirs.: T. D., Mrs. E. G. and P. P. Richards.

Abbey Pharmacies Ltd. 14.1.58. 87 Wardour Street, London, W.1. £1,000. Dirs.: H. I. and Mrs. E. S. Perlow.

I.C.I. (Heavy Organic Chemicals) Ltd. 20.12.57. Dirs.: Imperial Chemical Industries Ltd. Subs.: S. W. Weysom, Manuden, Waterhouse Lane, Kingswood, Surrey and A. G. Woods.

Berkeley Laboratories Ltd. 20.12.57 66-7 Newman Street, London, W.1. Mnfrs. of and dlrs. in cosmetics, etc. £1,000. Dirs.; D. Barkaway and M. Lee.

MEETINGS

Royal Institute of Chemistry

March 26. "Chemotherapy," by F. L. Rose. 6.30-7 p.m. College of Science and Technology, Manresa Road, Chelsea, London, S.W.3. Joint meeting with the Chelsea College of Science and Technology and the Chemical Society.

Chemical Society

March 17. "Formation and Reaction of the Organoperoxyboron Compounds," by Dr. A. G. Dacies. 5 p.m. University Chemical Laboratory, Lensfield Road, Cambridge.

March 20. "Chemistry of Pharmacologically Active Substances," by Dr. E. S. Stern, Dr. R. G. Johnston and Dr. R. B. Barlow. 7.30 p.m. Lecture room of the Royal Society of Edinburgh, 24 George Street, Edinburgh. Joint meeting with the R.I.C. and the S.C.I.

March 27. "Stereochemistry and the Transition Metals," by Prof. R. S. Nyholm. 6.30 p.m. Chemistry department, The University, Bristol.

Joint meeting with the R.I.C.

April 11. Symposium, "Recent Developments in the Chemistry of Fluorine," Large chemistry theatre, The University, Manchester. Joint meeting with the Inst. of Petroleum, the R.I.C. and the S.C.I.

April 16. Tilden lecture, "Some Recent Advances in the Chemistry of the Vitamins D," by Prof. B. Lythgoe, 7.45 p.m. University chemical laboratory, Trinity College, Dublin.

Fertiliser Society

March 20. "Nitric Acid," by D. A. Spratt. 2.30 p.m. Lecture hall of the Geological Society, Burlington House, Piccadilly, London, W.1.

Society for Analytical Chemistry

March 19. Scottish section. "Developments in Gas Chromatography." 7.15 p.m. The Royal College of Science and Technology, University of Edinburgh.

March 20. Midlands section. "The Determination of Toxic Substances in the Atmosphere." 6.30 p.m. Birm-

April 16. "The Analytical Chemistry of Silicones," by R. L. Bass. 6.30 p.m. Birmingham.

Society of Chemical Industry

Chemical Engineering Group

April 8. "Evaporation of Tempature-Sensitive Materials," by erature-Sensitive B. N. Reavell and G. A. Goodwin. 5.30 p.m. 14 Belgrave Square, London, S.W.1.

Corrosion Group

March 28. "Recent Research on Corrosion of Boiler Tubes," by the Corrosion of Boiler Tubes, E. C. Potter. 6.30 p.m. The Robinson lecture theatre, The University, Manchester.

THE CHEMICAL MARKET

SOME USEFUL REDUCTIONS

LONDON .- Aluminium stearate is down by £5 a ton and now costs £258. After rising last month Codeine phosphate has come down by over £10 per kg. Thiamine hydrochloride in 1 kg. quantities is over £1 cheaper. Sodium sulphate (Glauber salt) is 10s. per ton dearer. Prices of borax B.P. and boric acid B.P. have risen in all grades. Gums and waxes continue their fluctuations, the main reductions being in candelilla, paraffin wax and tragacanth. Shellac is dearer in most grades. All changes summarised last month have been incorporated in our lists.

FINE CHEMICA	ALS	Alkaloid 3 kg.	£12 7s. kg.
Acetanilide			£6 12s. 3d
	7s. 2d. kg.	Eucalyptol	
12½ kg.	78. 20. kg.	1-ewt. lots	12s. 6d. lb.
Arsenious oxide B.P. 7-lb. lots	1s. 9d. lb.	5-ewt. lots	12s. ,,
1 cwt, lots	1s. 2d. lb.	Ferri ammonium citrate	
	18. 20. 10.	1-cwt. lots, scales	4s. 8d. lb.
Ascorbic acid	04 14- 1	1-cwt. lots, granules	3s. 11d
100 kg.	£4 14s. kg.	Gallic acid B.P.C.	201 1101 11
Aspirin		1-cwt. lots	9s. 8d. "
56 lb.	5s. 2d. lb.	Glycerophosphoric acid	00. 00. ,,
1-cwt.	4s. 11d. ,,		11s. 10d. litre
5-cwt. lots	4s. 9d. "	24 litres	
Atropine	5.00	Glycine (amino acetic ac	
Sulphate, 500 g. & over		12½ kg.	22s. 4d. kg.
Alkaloid, 500 g.	£59 18s.	Hexyl resorcinol 10 kg.	£7 15s. kg.
Benzene B.P.C. 28-lb. lots	1s. 8d. lb.	Hydroquinone 12½ kg.	22s. 6d. kg.
Benzoic acid 12½ kg.	7s. 4d. kg.	Iodides	
Benzyl benzoate		Ethyl 1-lb. lots	90° 64 II
According to pack 5s.	to 5s. 6d. lb.		29s. 6d. lb.
Bismuth oxide B.P.C. 1934		7-lb. lots	28s. 6d. ,,
28-lb. lots	26s. 10d. lb.	Mercury, red B.P.C. 28-lb. lots	277
Bismuth salts		1-ewt lots	27s. ,,
28-lb. lots:		Potassium B.P.	26s. ,,
Carbonate	22s. 3d. lb.	28-lb. lots	Oc
Subgallate	21s. 1d. "	1-cwt. lots	9s. ,,
Salicylate	21s. 9d. "	Sodium B.P.	8s. 6d. "
Subnitrate	20s. 5d. ,,	28-lb. lots	14s. 1d. ,,
Borax B.P.		1-ewt. lots	13s. 2d. ,,
Powder (hessian bags)	£58 10s.	Iodine, Chilean crude,	105. 20. ,,
" (paper bags)	£57 10s.	99% min. in wooden	oneke
Extra fine (hessian bags		88 % min. In wooden	17s. 4d. kg.
" " (paper bags)	£58 10s.	Iodoform	115. Fd. kg.
Boric acid B.P.		12½ kg. and under 50 k	en Ale 6d km
Crystal (hessian bags)	£96 10s.	Lactose 50 kg.	3s. 4d. kg.
" (paper bags)	£95 10s.	Lithium salts 5-cwt. lots	05. Tu. ng.
Powder (hessian bags)	£94	Benzoate	11s. lb.
" (paper bags)	£93	Carbonate B.P.C.	11s. 3d. "
Bromine B.P.C.		Chloride (commercial)	
7-lb. lots	6s. lb.	emorate (commercial)	11s. ,,
Caffeine 50 kg.	42s. kg.	,, granular	10s. 9d. ,,
Calamine 50 kg.	4s. kg.	Hydroxide	9s. 9d. ,,
Calcium gluconate	0	Citrate B.P.C.	9s. ,,
50 kg.	9s. 6d. kg.	Sulphate	8s. 6d. ,,
Calcium glycerophosphate	an our age	Salicylate, 10 cwt., dl	
50 kg.	22s. kg.	Magnesium carbonate B.	
Calcium lactate B.P.		Light cwt. lots dlvd.	£129 ton
7-lb. lots	3s. 6d. lb.	Magnesium trisilicate 28-	lb. packages
1-cwt, lots	2s. 11d. "	28-lb. lots	4s. 3d. lb.
Chloral hydrate 50 kg.	10s. kg.	1-cwt. lots	3s. 10d. "
Citric acid, B.P.	0	5-cwt. lots	3s. 7d. ,,
Powder or granulated:		Bulk rates for larger	
	£11 5s. ewt.	from 3s. 1d. lb. in	
5-cwt. lots	£11 ,,	Manganese hypophosphite	
Codeine	,,	7-lb. lots	13s. 11d. lb.
		7-lb. lots 1-cwt. lots	13s. 11d. lb. 12s. 11d. ,,
	£103 3s. kg.		
Alkaloid 100 g.		1-cwt. lots	

Morphine	
Alkaloid, 100 g.	£106 14s. kg.
Nicotinamide 1 kg.	£4 10s. kg.
Nicotinic acid	
12½ kg.	52s. 6d. kg.
1 kg.	55s. ,,
Oleine, B.P. extra pale	
returnable	£170 ton
Phenolphthalein 50 kg.	24s. 3d. kg.
Phosphoric acid B.P.	1.1. 1. 1.1.11
(s.g. 1.750) 10 carbo	
Potassium permanganat 1-ewt. lots dlvd.	
Procaine hydrochloride	1s. 11¼d. lb.
1 rocaine nyuroemoriae	59s. 6d. kg.
Quinine 1 oz. lots	4s. 4d. oz.
Riboflavin	
100 g.	5½d. g.
10 g.	7d. ,,
Saccharin	
	or this quantity
Salicylic acid	
	d. to 5s. 6d. lb.
Silver nitrate	
500 g.	5s. 0_{16}^{1} d. oz.
Sodium benzoate B.P. 1-cwt. lots	os old lb
1-ton lots	2s. 9½d. lb. 2s. 7½d. ,,
Sodium salicylate	an 12tt. ,,
50 kg.	8s. 8d. kg.
12½ kg.	9s. ,,
Sodium thiosulphate	
Crystals, photograph	ic quality
1-ton lots	49s. cwt.
Stearic acid B.P.C. flake	£159 ton
Strychnine 25 oz.	
Alkaloid	5s. 10d.
Hydrochloride	4s. 11d.
Sulphate	4s. 11d.
Sulphaguanidine	990 100
12½ kg. 50 kg.	33s. kg. 32s. ,,
Sulphanilamide	043. ,,
12½ kg.	16s. 6d. kg.
50 kg.	15s. 4d. ,,
Sulphathiazole 12½ kg.	39s. 1½d. kg.
Tannic acid B.P. Levis	
1-cwt. lots	9s. lb.
Tartaric acid B.P.	
Powder or granulated 10 cwt. or more	1, £14 cwt.
Terpineol, B.P.	ALT CHE.
40-gal. drums	2s. 5d. lb.
1-cwt. lots	2s. 8d. ,,
Theophylline, B.P.	"
	or this quantity
Thiamine hydrochloride	
100 g.	4½d. g.
1 kg.	£14 2s. 6d. kg.
Thioglycollate Ammonium 12s. 4d.	to 16s. 4d. lb.
Calcium:	
7-lb. lots	17s. 3d. ,,
5-ewt. lots	14s. 3d. ,,
a-Tocopherol 10-a lots	1s. 2d. g.

1s. 2d. g.

£127 ton

26s. to 30s. 6d. lb.

Zinc oxide, B.P.

2-ton lots

Vanillin

a-Tocopherol 10-g. lots

GENERAL CHE	MICALS	Hydrogen peroxide	£192 100 ton	4 ton lots	£13 10s. to
A etic acid		27.5% weight	£128 10s. ton	1 ton lots	£15 ,,
1-ton lots dlvd.		35% weight	£158 ,,	Sodium sulphate	
80% Technical	£99 ton	Lactic acid (1-ton lots)	-L. 1 - 01J IL	Ex works:	010 4
80% Pure	£105 ,,	Pale tech. 44% by wei		(Glauber salt)	£13 to
Glacial B.P.	£114 ,,	Dark tech. 44% by w	eight 94a. ib.	(Salt cake) unground	
99-100% Glacial	£111 ,,	Magnesium chloride		S-1!	£8 16s. 6d. to
98-100% Glacial	£108 ,,	Solid (ex wharf): 1-to		Sodium sulphide	
Acetic anhydride			£17 10s. ton	Broken, returnable	
1-ton lots dlvd.	£143 ton	Magnesium sulphate		lots	£37 2s. 6d. to
Acetone			to £15 5s. ton	Flake, ditto	£38 12s. 6d. "
5-gal. drums, free, no	n-returnable	Mercurous chloride (calor	mel)	Solid ditto	£36 2s. 6d. "
	£128 ton	50 kg.	62s. 3d. kg.	Sodium sulphite	
40 to 45-gal. drums, 1	0-ton lots	Mercury sulphide, red		Commercial crystals	
	£88 ,,	Ton lots and over	29s. 3d. lb.		£24 10s. ,,
Alum, potassium granula		Methylated spirits (Indust	trial)	(Dlvd. London in 1	
50 kg.	1s. 2d. kg.	Perfumery quality	500 gal. and	returnable bags	
Aluminium hydroxide B.I		upwards:		Sodium tripolyphosphate	
28-lb. lots	2s. 4d. lb.	61 o.p.	7s. 4d.	1-ton lots	£95 tor
Aluminium stearate		74 o.p.	7s. 11½d.	Stannic chloride	
(Precipitate) 1-ton lot	S	5 to 10 gal.:	*	28-lb. lots	8s. 11d. lb
(A recipitate) 1-ton for	£258 ton	61 o.p.	8s. 8d.	Stannous chloride	
Ammonia	3200 0011	74 o.p.	9s. 31d.	28-lb. lots	9s. 5d. lb.
	£6 2s. 6d. ewt.	Methyl ethyl ketone	001 0201	Strontium carbonate	
Phosphate: Mono-	£106 ton	10 tons dlvd. in drums	s £143 ton	96-98% 28-lb. lots	3s. lb.
Phosphate: Mono- Di-	£100 ton	Methyl isobutyl carbinol		Zinc chloride	
Amyl acetate	£100 ,,	10 tons and up, in dru	ms. dlvd.	28-lb. lots sticks	6s. 9d. lb.
	en 6951 ton	to tons and up, in dru	£163 ton		
B.S.S. 10 tons and ove		Methyl isobutyl ketone	2100 0011	OILS AND	FATS
Technical	£249 ,,	10 to 50 tons, in drums,	dlyd £160 ton	Palm kernel oil	
Amyl alcohol	0000 4		divu. 2109 ton	Refined, deodorised	l. 2-ton lots.
Technical in 1-ton lots		Naphthalene	to anot	naked, ex works	£118 ton
Arsenic White powdered		Crystal, dlvd., 4-ton lo		Palm oil	£110 toll
	£37-£38 ton		65 4s. 3d. ton		l, 2-ton lots.
n-Butyl acetate	0180 4	Ball and flake (ditto) &		Refined, deodorised	
10-ton lots	£173 ton	Nickel sulphate dlvd. ton		naked, ex works	£108 ton
n-Butyl alcohol 10-ton lo	ts £152 ton	Nitric acid 70% intermed	nate £32 ,,	Stearine	11 1 /1 6
Calcium chloride		Pentachlorphenol		Flake triple-dressed,	
Solid 70 to 72%, 4-tor		Flake, technical, 1-ton		and non-returnable	e) £154 ton
	£15 10s. ton		2s. 2d. lb.		NI A STEEC
Calcium oxide (Lime)		Phenol Crystals:		GUMS AND V	WAXES
ex marble 28-lb. lots	3s. 10d. lb.	Under 1 ton dlvd. from	n 1s. 7d. lb.	Agar Agar No. 1	
Chloroform B.P. 1-ton lot	ts 3s. 1½d. lb.	10 tons and over dlvd.	in returnable	Kobe strip	13s. 6d. lb.
Chromic acid		drums from	1s. 4½d. lb.	Powder	18s. 9d. ,,
Dlvd. U.K. (less 2½%)		Phthalates		Beeswax	
2s. 0\d.	to 2s. 0¾d. lb.	10 ton lots in drums		Dar-es-Salaam spot (nominal)
DDT 3s. 0½d	to 3s. 2d. lb.	Diethyl	£187 10s. ton		£29 cwt.
2: 4-Dichlorophenoxyacet	ic acid	Dimethyl	£179 ton	Sudan spot	£26 ,,
99% pure, 1-cwt. bags	£340 ton	Potassium bromide		Bleached white (slab)	£30 ,,
Dimethyl sulphate 400 lb.		50 kg.	5s. 6d. kg.	Refined yellow (slab)	
	1s. 8d. lb.	12½ kg.	5s. 8d. "	Benzoin	
Ether (Di ethyl ether)		Potassium carbonate		Sumatra spot	£28 cwt.
Tech. B.S.S. and Solve	nt B.P.	Calcined 96 to 98% (1-ton lots ex	Siam spot	£2 7s. 6d. lb.
1-ton lots in drums	2s. lb.	store)	£76 ton	Candelilla Spot	£24 cwt.
Ethyl acetate 10-ton lots	£145 ton	Hydrated (1-ton lots)		Carnauba	
Ethyl alcohol	ar so ton	Potassium fluoride		Prime, Spot	£58 cwt.
95% Gay Lussac 66.0	D.D.	28-lb. lots	5s. 1d. lb.	Fatty grey	£30 ,,
2,500 to over 300,000	proof gallons	Potassium sodium tartrate	05. 10. 10.	Gum arabic	200 ,,
per year in tank wag		5-cwt. lots	£10 cwt.		£7 10s. cwt.
		Sodium cvanide	and ewt.	Lump	21 108. CWL.
4s. 2¾d. to 4s. 0¼d. p	4		0100 4	Karaya Bouler Suet	90 74 11
Ferrous sulphate 50 kg.	1s. 4d. kg.	96-98%	£128 ton	Powder, Spot	3s. 7d. lb.
Formaldehyde	1 12 1 1	Sodium hydroxide 28 lb. lo		Paraffin wax	A
40% by volume dl	vd. England	sticks (1 lb. bottles)	4s. 3d. lb.	1-ton lots, acc. to gra	
1-ton lots	£38 15s. ton	pellets ,, ,,	3s. 9d. ,,		0s. to £120 ton
Glycerin		Sodium metal 28-lb. lots	3s. 8d. ,,	Peru balsam	11s. 9d. lb.
1,260 s.g. chem. pure, 5		Sodium metasilicate		Shellac	
	£201 10s. ton	Dlvd. U.K. in ton lots	£26 ton	No. 1 orange	£14 cwt.
1,260 s.g. refined pale		Sodium phosphate		No. 2 orange	£13 5s. ,,
5 tons and up, 5-cwt		Dlvd. ton lots: Di-sod		Transparent white	4s. 9d. lb.
	£196 10s. ton	line	£40 10s. ton	Pale dewaxed	6s. 4,
Hexamine		Anhydrous	£88 ,,	Tragacanth	
HEXAUDIC		Tri-sodium, erystalline	£39 ,,	No. 1 spot	£152 10s. cwt.
1-ton lots			000	No. 2 spot	£142 10s. ,,
1-ton lots	1s. 8d. lb.	Annydrous			
1-ton lots Technical, bulk	1s. 8d. lb.	Anhydrous Sodium silicate	£86 ,,		
1-ton lots Technical, bulk B.P.C.	1s. 8d. lb. 1s. 11d. ,,	Sodium silicate	**	Pale leaf	£55 ,,
1-ton lots Technical, bulk			**		

4s. kg.

Os. kg.

6d. kg. 5s. ,, drums 70 ton

3d. kg. 4d. lb.

d. lb. kg. d. kg. d. oz.

½d. g. 7d. "

d. lb.

d. lb. d. "

. kg.

ewt.

10d. 11d. 11d.

kg. kg. kg. lb.

wt.

ity

g. g.

" " g. b.

n

t

Personal Recollections of the Victorian Drug Industry

Our quotations from "Manufacturing Chemist" of the 1890's have inspired a reader, Mr. Hugh Lattimer, to send the following recollections of the drug industry in London as he knew it sixty years ago. Mr. Lattimer is still actively engaged in the industry.

In January 1897 I was engaged by Messrs. Henry Ayscough Thompson and Son as a junior clerk at the wage of 10s. per week. This business was amalgamated with Messrs. Willows, Francis and Butler, whose premises in High Holborn were destroyed by fire and who subsequently took over the business and premises of Messrs. Herring and Son at 40 Aldersgate I remember the smallpox epidemic and how we commenced work an hour earlier to deal with the telegrams calling for supplies of vaccine; indeed so busy were we at. this time that the goods urgently required by post were taken to the post office in St. Martin le Grand in a hand cart. I forget the number of postal deliveries in those days, but they were at least four or five every 24 hours Monday to Saturday and one on . Sunday mornings.

Pill making. In those days pills were made by hand, some for veterinary practice up to 20 grains. Altogether the supply of drugs to veterinary surgeons in towns was valuable to the wholesale druggist.

I recollect the installation of the pill making machine, which was to us one of the wonders of the day. When Valerian pills were being made, all the cats from the various floors were attracted by the odour to the pill room.

Walking home. I have worked under six English Monarchs and I can well remember working late one night, with a senior clerk pricing in and valuing the stock after stock-taking. Shortly before 9 p.m. we heard Great Tom of St. Paul's Cathedral tolling and record-



Mr. Hugh Lattimer.

ing the death of Queen Victoria. We were both moved, and with tears on our cheeks decided to call it a day, put the books in the safe and left to walk home, yes, walk home for there were no motor buses or electric trams.

Speaking of trams, I remember the first electric trams running from Aldgate on the stud system. A snowstorm covered the studs, so that the current could not be picked up and the whole system was brought to a halt and thousands had to foot-slog home. The stud system was scrapped and the overhead system installed. remember the Metro. Railway running on steam. The stations and tunnels were filled with sulphurous fumes, so that it was necessary to keep the windows shut. As the windows became opaque by the fumes, it was necessary to count the stations to avoid passing one's destination, for it was quite impossible to see through the windows and the stations had only gas-light.

B. D. H. and Glaxo. When I entered the trade most of the druggists' concerns were partnerships, but one by one they transferred into limited liability companies. I remember the formation of British Drug Houses by Barron Harvey & Co., Hearon Squire & Francis, and Hodgkinson, Clarke & Ward. It caused some consternation and apprehension in drug circles.

As a young man, although working anything up to 80 hours per week for months on end, I commenced the study of Company Law, the Law of Arbitration and Awards, the Bankruptcy Laws, Advanced Book-keeping and kindred subjects, and having passed examinations was offered the secretaryship of the Indo-Burma Co. Ltd., who were engaged in shipping drugs, surgical dressings and instruments and hospital furniture to India, Burma and Malaya. They appointed sole agents for those territories by The Glaxo Co. Ltd. (now Glaxo Laboratories Ltd.), and the late Mr. Alec Nathan was often in my office. I packed and shipped the first consignment of Glaxo to Rangoon: it had an enormous sale.

Two other prominent visitors to my office were the late Mr. Veno, who sought my advice in putting his Lightning Cough Cure on the Indian market, and in 1914 (I think) the late Mr. F. W. Hampshire, of Snowfire fame, asked me to help him form his company, by giving him an order to put before the Treasury, so as to gain their consent to the formation. I gave him an order for 300 gross of bottles to be shipped monthly to Calcutta for filling with a fever cure.

In 1914 my wife was seriously ill and died in 1915 leaving me with two young children, I decided to enlist and took the King's shilling on November 9, 1915 and went into the R.A.M.C. and became attached to the 1st City of London Fusiliers. I was drafted to the military section of St. Bartholomew's Hospital and served under that eminent surgeon. Sir Wm. Girling Ball.

eminent surgeon, Sir Wm. Girling Ball.
Post-war changes. I returned to civil life in 1918 and had to start my career afresh, for owing to shipping difficulties during the war the directors of the Indo-Burma Co. had closed their London office and had appointed an agent. That war was the commencement of great changes in the export section of the drug industry. In about 1919 I purchased the business of the late Mr. A. J. Rippin who was trading in drugs, drysaltery and Mincing Lane produce. Later I was appointed agent for the Felling Zinc Oxide Co., for the drug, cosmetic and kindred industries. I believe we are today the foremost suppliers to these industries. They use the indirect process of manufacture, thus producing the most minute particle size, indeed it passes a British Standard 240 mesh with less than 0.01% residue.

I have never regretted connected with the drug trade.

being

	3	den Street, London, N	
their needs or	this form, givin	liers of chemicals or pla g approximate quantit end it to the Bureau, as	ties, clip it to
			-
For office use.	No.	Date.	

. CI . . . ENOUIDY DUDEAU

arron re & ce & ation

rking k for the w of ankping ving the Co. ping strunow late my first

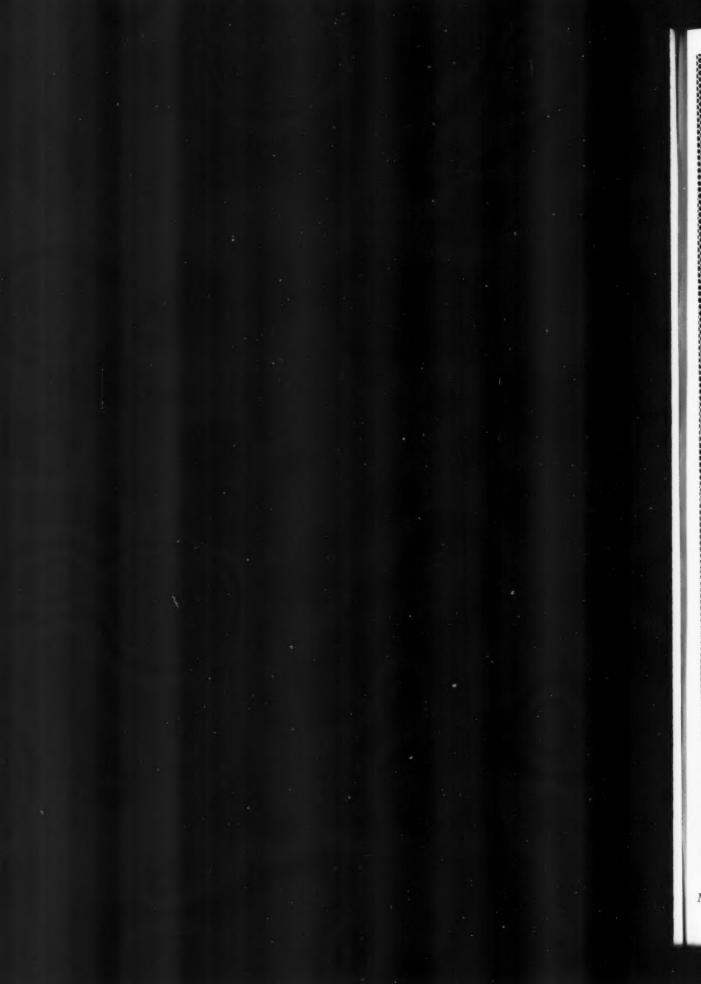
oon;
o my
who
his
dian
late
whire
his
er to
gain
gave
ttles
a for

and bung took r 9, and by y of b the ew's that Ball. I to my ping irecosed need need need need the ding ane

ane gent the ries. nost use ture, nute itish than

eing

nist



SYNTHETIC DRUGS

choline and salts
diphenyl sulphone (dapsone)
mercurochrome

calciferol (vitamin D2)

VITAMINS

cortisone acetate
hydrocortisone acetate
hydrocortisone free

CORTICOSTEROIDS

STEROIDS HORMONES

testosterone (its salts and derivatives)

oestrone-estradiol

progesterone



UCLAF

Département Commercial ·· A ·· 35, Boulevard des Invalides - PARIS-7 ·· - Tél. : SOL. 93-28

ROUSSEL LABORATORIES - 847, Harrow Road - LONDON N. W. 10 ENGLAND

XU-30-A





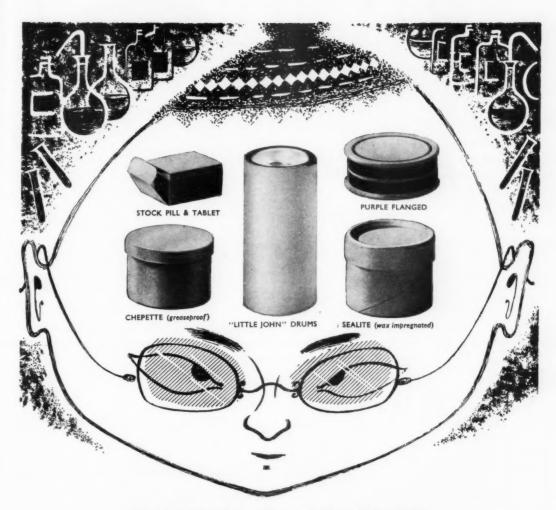
AND
LOW PRESSURE
EXHAUSTERS
for outputs from
2 to 30 cu. ft.p.m.
pressures up to
5 lb. sq. in.

Small Rotary Blowers are essential for many industrial purposes where a steady flow of air is required. A Blower to handle corrosive gases is now being developed.

LENNOX FOUNDRY CO., LTD.

Tantiron Foundry, Glenville Grove, London, S.E.8

GLYCERINE saponification · soaplye distilled and refined FATTY ACIDS crude · splitted · distilled OILS AND FATS animal and vegetable bulk and drummed FRIDO SIEMSGLÜSS HAMBURG 36 · KAUFMANNSHAUS Telegrams: Siemsgluessoil Telex: 0211767



A chemist with a bee under his bonnet

The chemist who doggedly insists upon Robinson's boxes is not being unreasonably obstinate after all. Robinson's standard boxes are designed with a practical appreciation of the chemist's viewpoint and backed by more than a century's experience. It's not easy to hold a grouse against that kind of box—unless, of course, you're a born grumbler.

Boxes designed to meet special requirements of the manufacturing chemist.



URE

om

to

Robinson Boxes

ROBINSON AND SONS LIMITED

WHEATBRIDGE MILLS CHESTERFIELD

Telegrams: "Boxes" Chesterfield. Telephone: 2105, 8 lines

London Office: King's Bourne House, 229/231, High Holborn, London W.C.I. Telegrams: 'Omnibox' Holb. London. Telephone: Holborn 6383

ist



And everywhere that PRODUCT went the NAME was sure to go....



Your Packages carry your message on

PRINTED
TACKY TAPE



ISSUED BY SAMUEL JONES & CO., LTD.

NEW BRIDGE STREET. LONDON, E.C.4.

TEL: FLEet St. 6500



See ALBRO for Fillers & Cappers



NEW 2-HEAD JUNIOR MODEL WITH BIG CAPACITY

This fast, accurate ALBRO 2-head semi-automatic Vacuum Filler (Junior Model) fills perfumes, lotions, oils and other liquids into wide-mouthed or sprinkler-necked bottles without spill or drip. Damaged bottles are automatically rejected.

Bench or pedestal mounted, this 2-head Junior Model features bright stainless steel parts where in contact with the product. Pedestal model has a built-in vacuum pump.

Ask for full details or, better still, a demonstration of the 2-head Junior and the many other models.

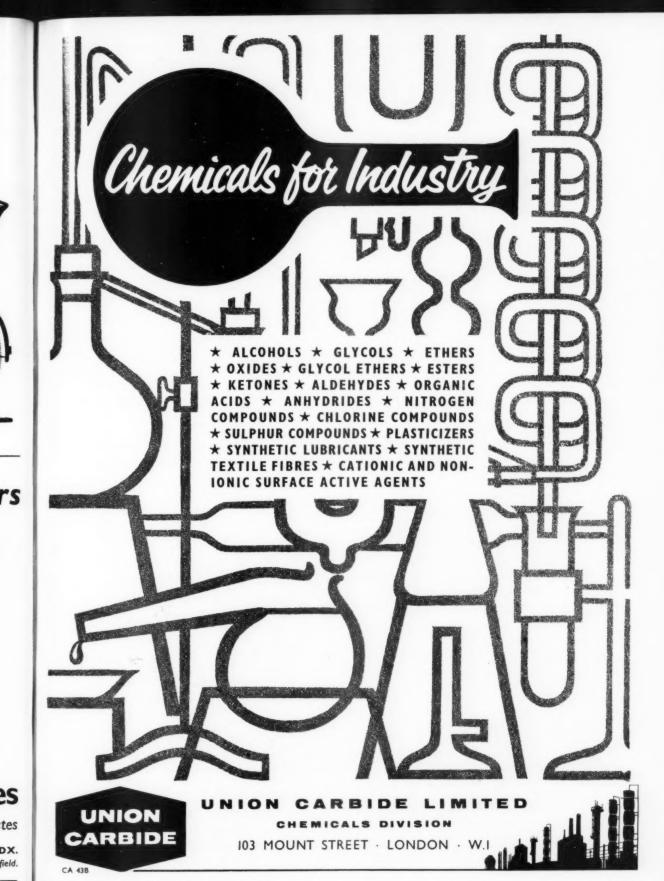
ALBRO Filling Machines

for Liquids, Powders & Pastes

ALBRO FILLERS & ENGINEERING CO. LTD., WHARF RD., PONDERS END, MIDDX.

Telephone: Howard 2622 (5 lines)

Telegrams: Albromach, Enfield.



Manufacturing Chemist-March, 1958

nist

GRAESSER SALICYLATES LTD

Manufacturers of the finest quality:

ETHYLENE GLYCOL MONO SALICYLATE PURE

THE SYMBOL of



QUALITY and SERVICE

An ideal, effective and well tried ingredient for analgesic and antirheumatic balms where an almost odourless end product is required.

Technical information and/or samples are available on request.

SANDYCROFT, NEAR CHESTER

TEL.: HAWARDEN 2125





S.H.JOHNSON&CoLtd

Chemical Engineers · CARPENTERS ROAD · LONDON · E.15

Telephone: Maryland, 7431 (6 lines)

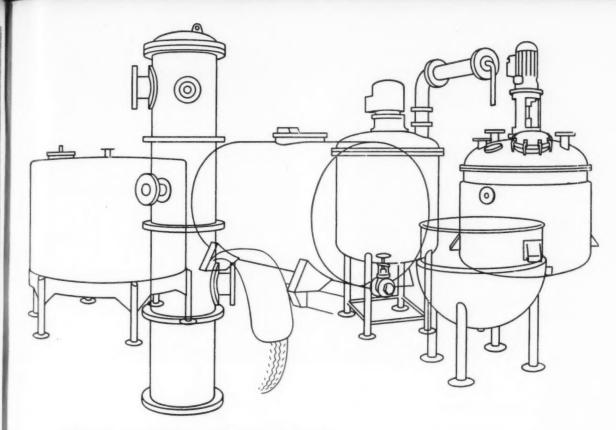
Telegrams: Filtrum, Easphone, London

AUSTRALIA

Swift & Co. (Pty) Ltd. Geelong House, 26/30 Clarence Street Sydney, New South Wales, CANADA

Dominion Scott Baron Ltd. 629 Eastern Avenue Toronto, 2 SOUTH AFRICA

The Dryden Engineering Co. (Pty) Ltd., Preston House, P.O. Box 815 Selby, Johannesburg



Vessels to a standard

or "specials" to order

Giusti has the answer in stainless steel

Our unique experience of stainless steel fabrication is wide because we specialise in diversity. For years we have made an exceptionally wide range of processing plant and equipment to order. Practically no job has been too small (and few too big) for us to produce a practical answer in good time and at a competitive price.

Now Giusti service includes a standard range of storage, mixing and jacketed vessels in stainless steel.

"Standard" or "Special," Giusti can meet your needs.



Plant and Equipment Engineers to the Chemical and Food Industries.

T. Giusti & Son Ltd., Belle Isle Works, 210-212 York Way, Kings Cross, London, N.7. Telephone: NORth 5021

Manufacturing Chemist-March, 1958

mist



Sole U.K. representatives - SCHENKERS LTD - Shipping and Forwarding Agents Royal London House, 13 Finsbury Sq., London, E.C.2. Tel: MET 9711 (15 lines) Telex London 22625

CHUCK-AWAY or cherish

The simplest wire-stitched carton that will safely carry spare drill chucks? A sophisticated chocolate box that will later cherish a lady's gioves? Both problems solved, as yours can be too, by the money-saving machinery of THE PACKAGING SPECIALISTS.



Johns, Son & Watts Limited, 2-4, Epworth Street, London, E.C.2 Monarch 7408



Mnoll' Fine Chemicals

enjoy world-wide

reputation

Barbonin®

(6,7-diaethoxy-l-[3,4-diaethoxy-benzyl]isochinoline)

Bromoisovalerylurea (Bromvaletone B.P.C.)

Caffeine Alkaloid and salts

Ephedrine, its salts and derivatives

Papaverine and its salts

Pentamethylenetetrazol (Leptazol B.P.)

Theophylline, its salts and derivatives

Theophylline Ethylene Diamine

distinguished by their purity and meet the requirements of the prominent

Marketed by

Alwitt Trading Co., Ltd.

pharmacopæias.

1, Broad Street Place LONDON, E.C.2

KNOLL A.-G. · Chemical Works · Ludwigshafen-on-Rhine

Manufacturing Chemist—March, 1958

mist



Vacuum Distilled THIOGLYCOLLIC ACID

SPECIFICATION

Assay HS-CH_s-COOH 75% (appr.) Dithiodiglycollic Acid Copper . . <1 p.p.m. <1.5 p.p.m. Iron Ash . 0.03 % max. Specific Gravity (at 20°C) . Water White Colour . . . Faint sulphidic Odour Miscible with water, alcohol, ether.

Also available: AMMONIUM THIOGLYCOLLATE CALCIUM THIOGLYCOLLATE

Apart from its very extensive use

in the manufacture of solutions for the

Cold Permanent Waving of hair, and as an analytical reagent, this Mercapto Acid, with two reactive functional groups, offers interesting possibilities as an intermediate in the synthesis of a variety of products.

CHEMICALS LIMIT

Manufacturing Chemists

BOREHAM WOOD, HERTS, ENGLAND Tel. ELStree 2445/6-Grams. FACILITIES PHONE LONDON-CABLES FACILITIES LONDON

Overseas Agents Robert Bryce & Co. Ltd., Melbourne, Sydney, Adelaide, Wellington, Auckland, Dunedin Pugh & Co. (Chemicals) S.A. Brussels, Jacobson Van Den Berg (S.A.) Pty. Ltd., Johannesburg

THE MORE EFFICIENT MIXING OF LIQUIDS

PLENTY Impelator

Saves time, power and costs

Designed to set in motion the liquids to be mixed by a combination of centrifugal force, suction, shearing action and counter current whirl. Creates an intense mixing zone whilst promoting a very high velocity flow. Gives you maximum dispersion with minimum particle size. The Impelator is made for laboratory and pilot plant size, as well as up to any size to suit existing or new mixing vessels. Suitable for the manufacture of solutions, mixing of liquids with solids, the preparation of emulsions and the mixing of liquids of varying viscosities.





PLENTY & SON, Ltd. Newbury, Berks.

Tel.: NEWBURY 2363 (4 lines) Grams: Plenty, Newbury Also makers of Marine Engines and Rotary Displacement Pumps.

M.C.



The folder which tells you all about it FREE on request.

Bospic posed a problem

FLEXILE simply solved it

The makers of 'Bostik' the well-known sealing compound, had a problem—to find a contemporary tube for their new-style adhesive 'Clear Adhesive' without materially increasing costs. Like so many manufacturers, they called in Flexile. The new Flexile Polythene Flowerpot Cap gave the complete answer. Here's why. 1. As the caps were made from standard tools, no extra tool charges were incurred. 2. Being polythene and wadless, the caps could be supplied at low cost. 3. The special ring seal gave perfect closure and eliminated seepage, yet the cap, being polythene, did not become cemented to the nozzle. 4. The distinctive appeal of the cap gave an entirely new look to a 'Bostik' tube. Yes, Flexile have a flair for solving tube packaging problems . . . they can help you solve yours. Phone Flexile first.

FLEXILE

OF STEVENAGE

JUST PUBLISHED. A new brochure "If the cap fits . . ." describes all the avantages of Flexile Polythene Caps. Send for a free copy TODAY

FLEXILE METAL CO. LTD., BESSEMER DRIVE, STEVENAGE, HERTS · STEVENAGE 1491

Manufacturing Chemist-March, 1958

nist

We undertake the Design and Manufacture of all types of:

SPECIAL PURPOSE MACHINES

AND LABOUR SAVING EQUIPMENT

We have solved others' problems . . . may we help you?

AUTOMATION DEVELOPMENTS LTD

in association with:

SOUTHERN APPARATUS CO. LTD TOTTON · SOUTHAMPTON · HANTS

Telephone: Totton 3141-3

Effesay

Sulphated primary alcohols

Nervan CFB

Sodium butyl naphthalene sulphonate: a wetting agent of high stability.

Anonaid T

Sodium dioctyl sulpho-succinate
A highly efficient surface tension depressant

Nervan EL

Sodium dodecyl benzene sulphonate: an economical and efficient detergent and wetting agent.

NORMAN EVANS & RAIS LIMITED

POLEACRE LANE, WOODLEY, STOCKPORT. Tel: Woodley 2277 (4 lines). Grams and cables: Chrievan, Stockport.

NER. Y

Troublesome Liquids

CORROSIVE - EROSIVE - STICKY - GRITTY

TUNGSTONE PUMPS can handle them all

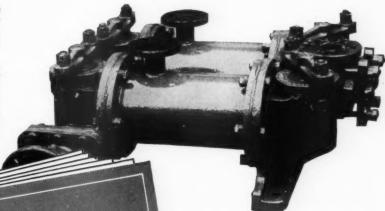
Every industry handling troublesome liquids — corrosive, erosive, sticky or gritty — uses TUNGSTONE Pumps... sturdy, leak-proof and astonishingly low in maintenance costs.

ES

D

nist

TUNGSTONE has two unique features: (a) the unit is constructed of materials which resist corrosion by any particular liquid; (b) there are no moving parts except the valves, no packing or glands within the unit and there is nothing to clog or choke since air is used as a piston — although it never mixes with the liquids.



NICKEL/CAST IRON 10 sizes, 375 to 9,000 gals./hr. (Rubber lined—in 8 sizes, 800 to 9,000 galls./hr.)

AIR-PRESSURE

Pumps

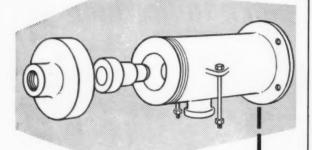
Write for the
TUNGSTONE
Booklet on the
pumping of corrosive,
erosive, sticky or
gritty liquids

TUNGSTONE PRODUCTS LTD

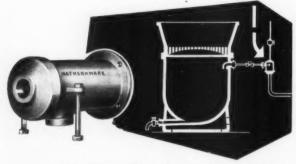
Market Harborough Leics England Phone: Market Harborough 2245

STOCK SINGLE STAGE

EJECTORS



Made of Chemical Stoneware with iron armourings for STEAM OR LIQUID OPERATION



Examples of PERFORMANCES of standard stock Ejectors

STEAM-OPERATED

Capable of creating vacuum up to 26" mercury, and handling up to 50 cu. ft. of Free Air per minute at 5" mercury. Optimum Steam Pressure 45 lb/sq. in.

LIQUID-OPERATED

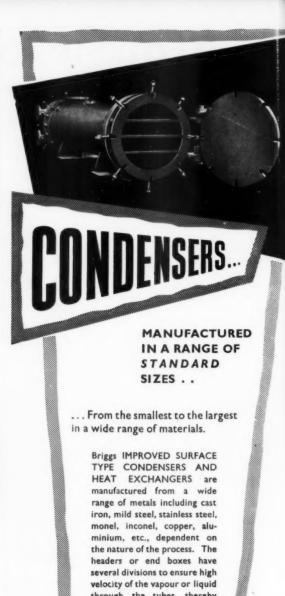
Capable of creating vacuum up to 28" mercury, and of evacuating 10 cu. ft. space to 10" mercury in 22 seconds.

HATHERNWARE

For further information write for catalogue section No. 11

HATHERNWARE LTD., (Dept. M.C.), LOUGHBOROUGH, LEICESTERSHIRE

Telephone: Hathern 273



through the tubes, thereby increasing the efficiency of heat transmission.

We should be pleased to send you further details and particulars of our wide range of standard sizes.

Ask for publication C.110.



BRIGGS & CO·LTD JRTON-ON-TRENT





Glass-lined equipment and careful supervision ensure that the "Coalite" Chemicals you receive maintain their consistent high standard of purity.

CHLORINATED PHENOLIC COMPOUNDS

2: 4 Dichlorophenol.2: 4: 6 Trichlorophenol.Para Chloro Ortho Cresol.

6. Chloro Ortho Cresol.

Dichloro Meta Xylenol (D.C.M.X.) Chlorinated Xylenols. Para Chloro Phenol.



D

ist

HIGH BOILING TAR ACIDS

including white emulsion grades for use in high quality disinfectant fluids.

FULL RANGE OF CRESYLIC ACIDS

including: Phenol • Ortho Cresol • Meta/Para Cresol • Xylenols—blended to consumers requirements.

DIHYDRIC PHENOLS

including Catechol, Methyl Catechols and Methyl Resorcinols.

COALITE AND CHEMICAL PRODUCTS LTD

CHESTERFIELD . DERBYSHIRE Telephone : BOLSOVER 2281/6

Your enquiries are welcomed and literature describing the 'Coalite' range of products is available on request.

Manufacturing Chemist—March, 1958

A65

• We refine a wide variety of coal tar and petroleum fractions.

Specially distilled fractions can be prepared to meet specific requirements.

BENZENE PENTANE
TOLUENE HEXANE

XYLENE HEPTANE

CARLESS CAPEL & LEONARD LTD.

HACKNEY WICK . LONDON . E.9 . Telephone: AMHERST 5500



WITH OVER 25 YEARS GRINDING EXPERIENCE WE SHOULD KNOW

The Bauermeister Turbo Mill is the Criterion of To-day FOR...

- HIGHEST DEGREES OF FINENESS
- A STEEP CURVE OF GRANULAR DISTRIBUTION
- HIGH OUTPUTS
- MINIMUM MAINTENANCE
- LOW POWER CONSUMPTION

Designed with electro magnetic or mechanical feeding devices

Bramigk & Company Ltd.

ENGINEERS, 15 CREECHURCH LANE, LONDON, E.C.3

A full range of models.

Test laboratory facilities.

Prices to factory most reasonable.

Deliveries almost immediate.

ESTABLISHED 1872 . CABLES: BRAMICK, LONDON . AVENUE 4822-4825

A66

March, 1958-Manufacturing Chemist

Without a shadow...of doubt



Flurolier Lighting Fittings

To meet Industrial demands for the highest level of illumination in factories, The Benjamin Electric Ltd., offer a range of Flurolier Fittings—in single or continuous runs—for fluorescent lighting. Unobtrusive in appearance, Flurolier Fittings provide a cut-off in accordance with factory regulations; are adaptable to every method of installation; have an exclusive lampholder design and are easily detached for cleaning or maintenance. All in all, Flurolier Fittings are industries' choice without a shadow of doubt. Please send for full details of the complete Flurolier range.

FOR CONSTANT, HARDWEARING PROTECTION FLUROLIER REFLECTORS ARE FINISHED IN 'CRYSTEEL' VITREOUS ENAMEL WHICH GIVES A PERMANENTLY WHITE, HIGHLY REFLECTIVE SURFACE. FOR LESS ARDUOUS CONDITIONS ASK ABOUT 'PEROPAL' FINISH.

Better lighting by

ices

ist



THE BENJAMIN ELECTRIC LTD - TOTTENHAM - LONDON N.17

PHONE: TOTTENHAM 5252 (5 LINES) . GRAMS: BENJALECT SOUTHTOT LONDON

BIRMINGHAM: 3 CORPORATION STREET · BIRMINGHAM 2 · TELEPHONE: MIDLAND 5197

LEEDS: 49 BASINGHALL STREET · LEEDS I · TELEPHONE: LEEDS 22579

P.C.O.C. Parachlor-ortho-cresol

For many years we have been large-scale manufacturers of this widely-used intermediate for which we should be pleased to receive your enquiries and to submit samples at your request.

In addition we should like to draw your attention to the undermentioned selection from our production of fine chemicals.

D.D.T. (and certain formulations) | Dichlorphenol

Terpineol

D.C.M.X.

H.R.W.

P.C.M.X.

Chloral Hydrate B.P.

Terpinolene

M.B.T.

M.B.T.S.

Benzylated-Cresylic-Acid

Chloral Anhydrous

The finest of the fine from:

COCKER CHEMICAL CO. LTD. (Dept. SX.)

OSWALDTWISTLE . LANCASHIRE

Tel.: Accrington 3621-3

If it's a question of mixing

Do you make Dyes, Drugs, Detergents or Drinks -Oils, Ointments, Emulsions or Inks?

Do you produce Paints, Polish, Plastics or Petrol Products -Lotions, Lacquers or Liqueurs - Cereals or Soaps?

Do you manufacture Food, Fodder, Pharmaceuticals or Fertilizers?

Whatever your final product, it will be composed of ingredients that must be mixed in certain proportions.

There may be a thousand and one ways of choosing these percentages, all consistent with your customer's requirements.

But only one of these mixtures will satisfy YOU: the one that costs less to make than any of the thousand others.



How can you determine the exact composition of this LEAST COST MIX?

By using a modern mathematical method, suitable for electronic computation.

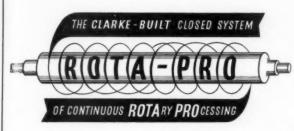
There is such a method. The economists have a word for it: LINEAR PROGRAMMING. Ferranti have a computer for it: The PEGASUS at Portland Place. It will find your Least Cost Mix quickly - accurately - unfailingly. Phone or write to us for details of our Computing Service. You may find, as others have, that your investment in Least Cost Mix Computations gives you a hundredfold return.



WEST GORTON · MANCHESTER 12

Telephone: EASt 1301

London Computer Centre: 21 PORTLAND PLACE, W.1. Telephone: LANgham 9211



For Creams, Pastes, Syrups Margarine, Lard Shortening Sauces, Jams, Fats and all VISCOUS liquids.

CONTINUOUS CAPACITY UP TO 8,000 lb. per hour

"ROTA-PRO"

(Registered Trade Mark)

ich

our

cid

X.)

details

ce. You

e, that

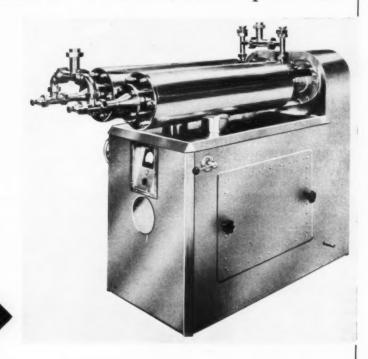
st Cost s you a

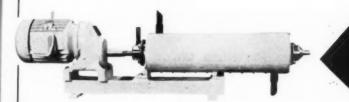
St 1301

emist

is a rotary, scraped-surface heat exchanger in which even the most viscous liquids, and those containing a high proportion of undissolved solids, can be efficiently processed above their normal boiling points or below 0° C. The process is continuous, through a closed, mechanically controlled system. Rapid and efficient heat transfer is ensured, and both heating and cooling of the product can be carried out separately or together as required.

Each "ROTA-PRO" machine is specially designed for the particular duty for which it is required. One, two or three-cylinder machines can be supplied.





The Junior "Rota-Pro" has been specially designed for use in pilot plants and for experimental and laboratory work in the study of the many advantages of continuous rotary processing.

Whatever the problem of continuous processing, we shall be glad to provide full information and the necessary personal liaison. Please contact Technical Sales Division:

GLARKE-BUILT LIMITED

POWER ROAD · CHISWICK · LONDON · W.4
Telephone: CHISWICK 7631-4 Telegrams: CLARKBILT, CHISK., LONDON

Worried by 'bottle necks'

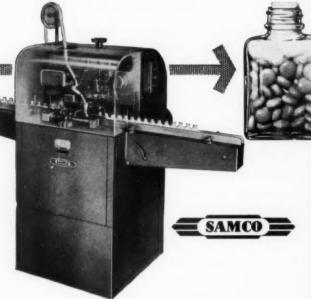
in wooling?

Then install the SAMCO
AUTOMATIC
COTTON WOOL
INSERTING MACHINE

- Fully automatic
- Quick change for bottle size and shape

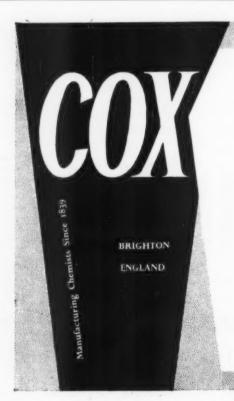
ensuring complete under-shoulder protection for tablets

Unique method of insertion-



Write for full details

B.U. SUPPLIES & MACHINERY CO. LTD., BOSTON HOUSE, ABBEY PARK ROAD, LEICESTER



offer a complete

Manufacturing & Packaging

Service

from formula to counter

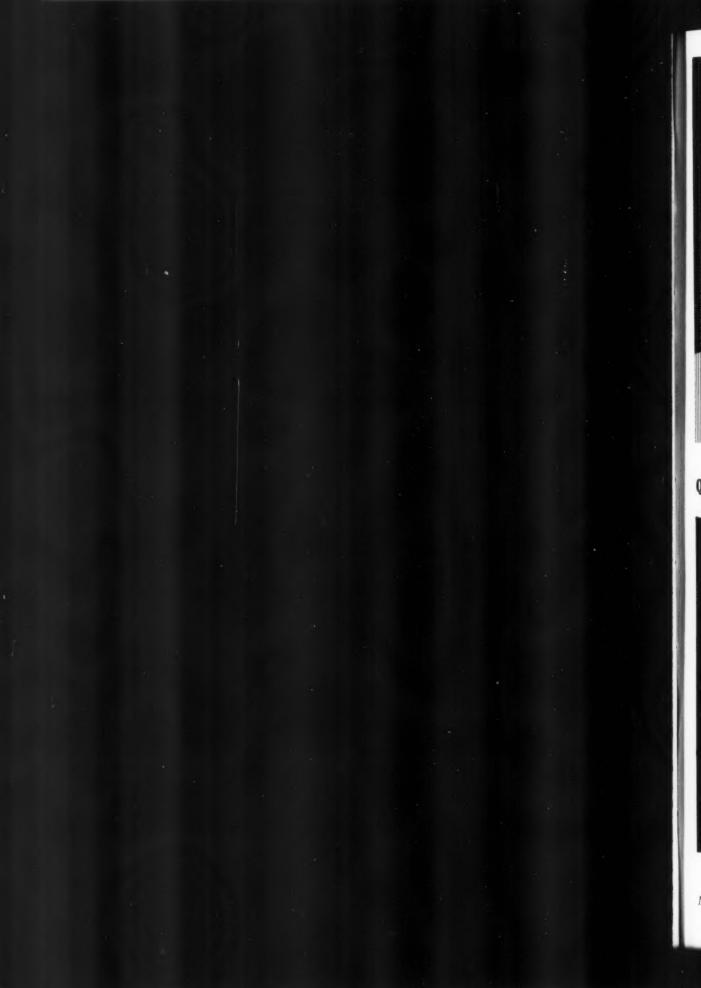
ARTHUR H. COX & CO. LTD.
BRIGHTON · ENGLAND

The foremost Tablet House



STER

emist



At your service

Texofors

CETOMACROGOL 1000 B.P.C. AND ALLIED NON-IONIC EMULSIFIERS AND DISPERSANTS.

Morpans

CETRIMIDE B.P. AND RELATED QUATERNARY AMMONIUM BACTERICIDES.

Collones

CETOMACROGOL WAX B.P.C. EMULSIFYING WAX B.P.
AND RELATED EMULSIFYING WAXES.

Trisophones

ALKYLOLAMIDES.

GLOVERS

(CHEMICALS) LTD.

WORTLEY LOW MILLS, LEEDS 12 Tel: LEEDS 63-7847/8/9 Grams: Glokem, Leeds.

Manufacturing Chemist-March, 1958

BRITISH PHARMACOPŒIA 1958

This new edition of the Pharmacopæia supersedes, as from September 1, 1958, the British Pharmacopæia 1953 as amended by the Addendum 1955. The book has been completely revised and greatly extended. It now contains 826 monographs of which 160 deal with substances and preparations new to the Pharmacopæia.

The monographs provide standards and methods of test for a wide range of inorganic and organic compounds, synthetic chemicals, antibiotics and biological substances and also for preparations, including tablets, injections and ointments.

There are 27 Appendices providing descriptions of chemical, physical and biological assay procedures including:

Quantitative tests for arsenic and lead.

Determination of melting-point, boiling-point, viscosity and light absorption.

Determination of ash, alcohol content, and total solids.

Chemical analysis of fixed and volatile oils.

The Appendix on biological assays and tests includes a section on the design and accuracy of biological assays and methods for antibiotics, serological and bacteriological products, hormones, etc.

Publication Date: March 3, 1958

Official from: September 1, 1958

Pages xxvi+1012

Postage 2s. 3d. (overseas 4s.)

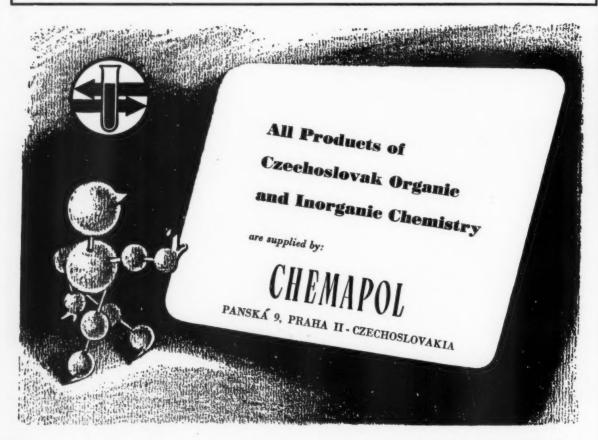
Price 63s.

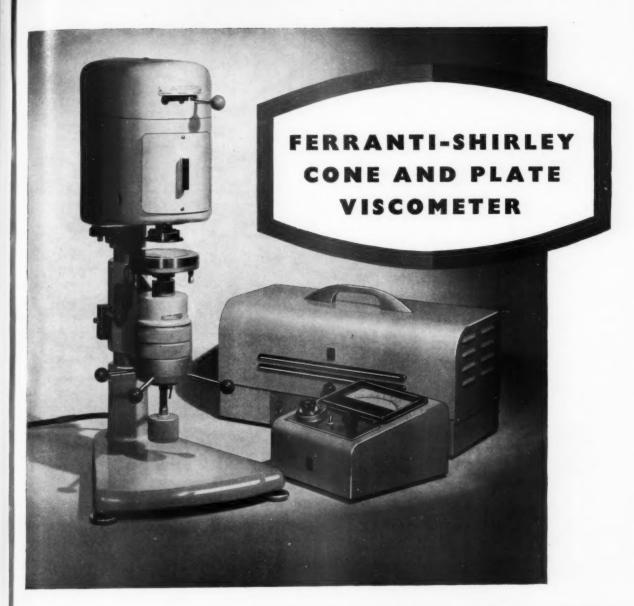
Published for the

General Medical Council

by

THE PHARMACEUTICAL PRESS, 17, Bloomsbury Square, London, W.C.1





- ★ Constant shear stress and shear rate throughout the measured sample.
- ★ The shear rate is continuously variable from 2 to 20,000 sec.-1
- * Extreme rapidity and ease of operation, cleaning and filling.
- ★ The sheared liquid layer averages only 0.05 mm. in thickness and 0.1 ml. volume, giving rapid initial temperature stabilisation and minimising shear induced temperature rise at high shear rates.

Please write for fully illustrated brochure IN.126



FERRANTI LTD . MOSTON . MANCHESTER 10

London Office: KERN HOUSE - 36 KINGSWAY · W.C.2

F1171





A. FIFER LIMITED

Buckingham Avenue · Slough Trading Estate · Bucks.

ASK US TO HELP. YOU WILL BE UNDER NO OBLIGATION FIFERPACKS

for protection

Telephone · Slough 23358



t's new! it's polythene! it has a handle for easy removal,

No more leaking bottles, no more complaints that once opened the bottles are not sealable again. In fact 'HERM'ATIC' plugs, made in twelve sizes, solve your sealing problems and ensure complete customer confidence, resulting in repeat sales. And now these little polythene plugs are being manufactured with a hooped flange or 'handle' which enables the user to remove and replace it with ease!

Samples on application

"HERMATIC"

BOTTLE CO. LTD.

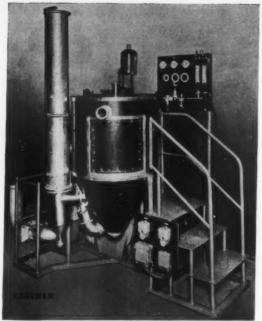
140 PARK LANE, LONDON, W.I.

Teleph MAYfair 6992 (S lines) Telegrams AUTREFOIS, AUDLEY, LONDON

Manufacturing Chemist-March, 1958

g is ble.

ist



Kestner Spray Drier for Research and Pilot work.

LABORATORY AND PILOT PLANT

A comprehensive range of standard small-scale unit plants, embodying the principal features of the well-known Kestner industrial plants, is now available including:

DRIERS—Spray, Film, Vacuum Oven and Shelf Types, Rotary Kilns, and Tunnels.

STILLS-Vacuum or Non-Vacuum.

AUTOCLAVES & REACTION VESSELS

STIRRERS AND AGITATORS · SMALL-SCALE PUMPS

FANS · VALVES · VESSELS, etc.,

for handling any corrosive gas or Liquid.

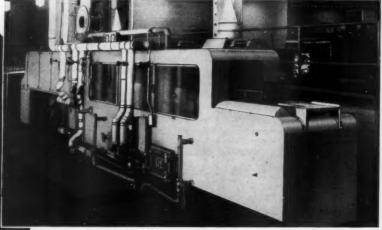
KESTNER EVAPORATOR & ENGINEERING CO. LTD.

5 GROSVENOR GARDENS · LONDON S.W.1



Dawson
new improved
Washing and
Drying plant
for Chemists
Bottles





ENSURING A UNIFORM STANDARD OF CLEANLINESS FOR EVERY BOTTLE & JAR

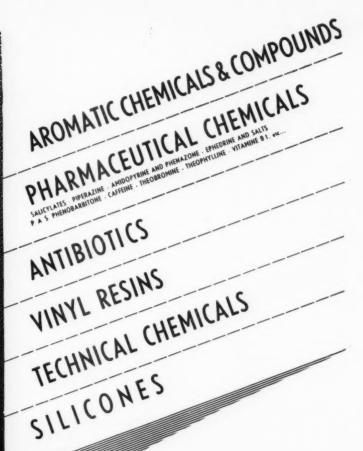
The Dawson range of washing machines provides manufacturing chemists with a fast, dependable and economical means of washing and drying bottles and jars. All sizes and all shapes can be handled and provision is made for label removal and disposal where required and complete drying. So many of Britain's leading firms today rely on Dawson washing plant.

Write stating the size, shape and quantity per hour you wash and we shall be pleased to suggest a suitable Dawson machine to handle this.

DAWSON BROS. LTD., GOMERSAL Nr. LEEDS. Tel: Cleckheaton 1080 (5 lines)
London Works:

Roding Lane South, Woodford Green, Essex. Tel: Wanstead 7777 (4 lines)

March, 1958-Manufacturing Chemist





RHÔNE POULENC PARIS - FRANCE

Agencies
and depots
in all
the principal
Cities
of the
World

OF AR

ring

and

and

on

this.

nes) nes)

mist

Manufacturing Chemist-March, 1958



FARBWERKE HOECHST AG.

vormals Meister Lucius & Brüning Frankfurt (M)-Hoechst



Distributors for chemicals in the U:K.:

HOECHST CHEMICALS LTD., 50, Jermyn Street, London S.W. 1, Tel. Reg. 7534
75, Piccadilly, Manchester 1, Tel. Central 2234/5

200 PRINTS PER MINUTE

HIGH-SPEED FULLY AUTOMATIC

CARTON OVERPRINTER

- FOR TUCK END CARTONS
 - ALL PRINT DETAILS
 IN ONE OPERATION
 - LONG OR SHORT RUNS
 - EASY QUICK CHANGE OF DETAILS
- OVERPRINTED CARTONS AUTOMATICALLY STACKED FOR DISPOSAL

Enquiries cordially invited.

REJAFIX LIMITED, 81-83 FULHAM HIGH STREET, LONDON, S.W.6

MODEL_K2

ORT

V.6

nist



GLASS containers



Glastics

BARNET TRADING ESTATE . PARK ROAD . HIGH BARNET . HERTFORDSHIRE

Telephone: Barnet 1041 Telegrams: Glasplas Barnet

WORKS: TRENT VALLEY GLASSWORKS LTD., HATTON, DERBYSHIRE

Quality glass bottles and containers



Since 1891 we have specialised in the manufacture of glass bottles and jars for the Pharmaceutical and Chemical Trades. We can offer prompt delivery from stock of all sizes of our standard lines, but should you prefer a distinctive container of your own design we will gladly make moulds to your specification. May we have your next enquiry?

First Class in GLASS



Registered Office: SCOTT HOUSE, 98 SOUTH ACCOMMODATION ROAD, LEEDS, 10 one, Leeds 10" Factories: Albert, Clarence and Donisthorpe, Hunslet, Leeds

Grams: "Feeders, Phone, Leeds 10" Factories: Albert, Clarence and London Office: St. Martin's House, 29 Ludgate Hill, E.C.4 Tel. City 7170



Automatic water still

CONTINUOUS IN OPERATION

If you want genuine distilled water, there's only one way to get it—by using a still. Whatever your process, a reliable and economical source of highest quality distilled water is always at hand when you install a MANESTY Automatic Water Still. Users of distilled water the world over acknowledge the special virtues of MANESTY Stills, for they give maximum efficiency at minimum cost.

Models are available with outputs from 2 pints to 50 gallons per hour. All models fitted with wall bracket.

Write today for full details of these models



MANESTY MACHINES LIMITED

DEPT. 6B, SPEKE, LIVERPOOL, 19

Telephone: Hunts Cross 1972

Telegrams: Manesty, Liverpool, 19

TABLET MACHINES

COATING PANS

GRANULATORS

MIXERS

PUNCHES AND DIES

cal opt ord oer lds

S

, 10 ceds

is

nist



AMPHETAMINE

CHLORIDE

BENZOIC ACID

SODIUM BENZOATE

PHENVLACETIC ACID A number to remember D.D.T.

CLISSOLD 1234

VANIELIN

COUMARIN

ANISALDEHYDE

ACETATE BENZYL

TERPINEOL

IONONE

GERANIOL

ANTHRANILATE

BUSH & CO . LTD . LONDON . E . 8 . ENGLAND

Crill S8

Sorbitol Mono-Stearate

Polyoxyethylene Derivative

is a light-coloured pasty material, soluble in water, alcohol and solvents. It is used in high quality O/W cosmetic emulsions, as auxiliary for solvent emulsions, as a dispersing agent in water-proofing preparations and for insecticides. In combination with Crill K3 it represents a very useful blend of both hydrophobic and hydrophilic action. Write for information.

Croda

Goole

London

New York

Manchester

Bradford

Croda Ltd. Cowick Hall, Snaith, Goole, Yorks.

Tel: Snaith 277



BEESWAX B.P., White and Yellow. Also Compositions.

SPERMACETI, Finest Snow White. CARNAUBA WAX, Fatty Grey, Yellow, Bleached and Residues, various

CANDELILLA WAX, FIBRE WAX, OURICURY WAX, etc.

MONTAN WAX, Crude and Bleached.

HIGH ST., STRATFORD, LONDON, E.15

Telegrams:
POTHASKA, LONDON, E.15 MARYLAND 7091 (3 lines) Works: HUNT'S LANE, BOW BRIDGE, STRATFORD, E.15 OZOKERITE, White, Natural, Yellow and Crude.

CERESINE WAX, all grades and PARAFFIN WAX, all Melting Points.

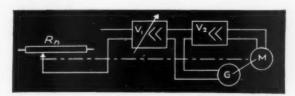
POLISH WAXES, for Car, Shoe, Floor and Furniture Polish makers. CABLE WAXES, for Saturating and Finishing. All grades and colours.

The principle of the damping system:

M = Servo-motor: two-phase induction type. Two stator windings energised from mains, two (with 90° phase-shift) from output stage of push-pull amplifier. Direction of rotation phase-dependent on amplifier input signal.

 $\mathbf{G} = \text{Tacho-generator}, \ \text{mechanically coupled}. \ \text{Delivers voltage linearly proportional to speed of slide-wire contact.}$

VI: V2 = Amplifier. First stage (VI) adjustable. Voltage generated by G fed back into V2. Output from amplifier applied to servo exerts braking action on rotor.

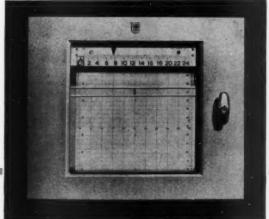


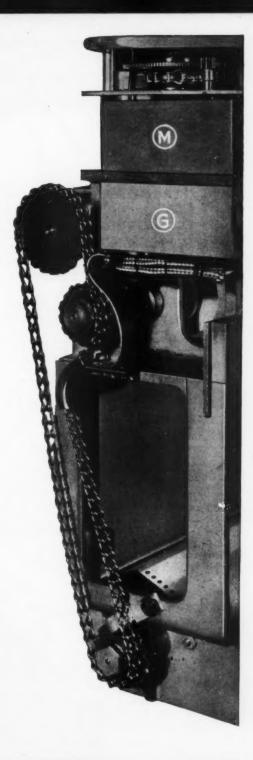
No overshoot with this potentiometric recorder by **PHILIPS**

In an instrument with a fast response time, accuracy demands that the measures taken to arrest momentum must be more than usually effective and always critically sensitive. Over a full scale-length of 25 cm., most versions of potentiometric recorders by Philips have a balancing time of only one second and a positioning accuracy of 0.1% of the total measuring range.

For the measurement and control of practically any

For the measurement and control of practically any variable reproducible as an electrical signal, there is a Philips potentiometric recorder to match the need. We welcome your enquiries.







PHILIPS ELECTRICAL LTD

RESEARCH AND CONTROL INSTRUMENTS DIVISION
Century House ' Shaftesbury Avenue ' London ' W.C.2
Telephone : GERrard 7777

(PRC0265

SILVERSONS MACHINES

SUPREME FOR MIXING, EMULSIFYING, MILLING, GRINDING, PUMPING



Gives an efficient mix with materials of any viscosity. The shaft is designed for easy change-over from a big variety, of blades, and for use with one, two or more blades to provide an ideal combination for anything from liquids and creams to gels or paste. All stainless steel construction. Sizes from ½ h.p. to 10 h.p.



MACHINE (SALES) LIMITED
SS-57 TOWER BRIDGE ROAD, LONDON, S.E.I
Telephones: HOP 1777 and NEW CROSS 5222



SILVERSON MULTI-PURPOSE HIGH
SPEED MIXER EMULSIFIER
Universally used all over the world by all the largest chemical, comentic and food manufacturers, laboratories, hospitals, etc. For mixing, emulsifying, viscolising, straining and pumping with the greatest of ease and a minimum of labour. Model illustrated will pump at the amazing speed of 1,400 gals, per hour and can also be used for direct filling to containers.

Famous products sealed with

ALU-PHARM ALUMINIUM CAPSULES

- ★ Hygienic . . . Your bottle necks covered and protected from dust. (Awarded the Gold Sealed Certificate of the Royal Institute of Public Health & Hygiene).
- ★ The adhesive coating of Alu-Pharm Overscals provides tamper-proof seal and complete security for your product.
- * Sizes available for most types of bottle closures.
- ★ Speedy application, either semi- or fully-automatic.
- ★ Wide range of standard colours or special shades to match your labels.

Why not send us a bottle of your product to be capsuled and returned to you with full particulars?

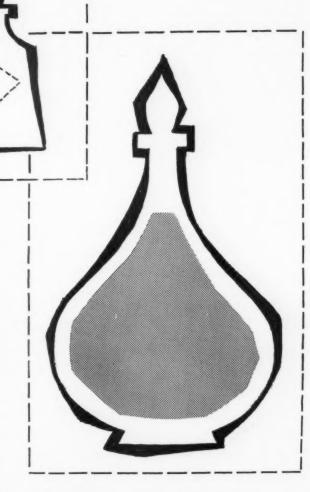




DEAL CAPSULES LTD. SLOUGH, BUCKS. Telephone: Slough 22251 (5 lines) Telegrams: "Iseal, Slough."

M





in ESSENCES

as solvent and carrier . . .

in COSMETICS

as softening agent, preservative. spreader, emollient, humectant, solvent and mould inhibitor . . .

in PHARMACEUTICALS

as solvent and anti-oxidant . . .

PROPYLENE GLYCOL from PETROCHEMICALS

PETROCHEMICALS LTD. An Associated Company of Shell Chemical Company Limited

Southern Divisional Sales Office: Norman House, 105-9 Strand, London, W.C.2. Tel: TEMple Bar 4455.

Northern Divisional Sales Office:

144-146 Deansgate, Manchester 3. Tel: Deansgate 6451.





PGD/I

st

AVAILABLE IN B.P.C. AND U.S.P. GRADES FROM U.K. PRODUCTION



When it's a question of analysis . . .

more often than not—by optical methods.

Metals, ceramics, glasses, oils, plastics,
foodstuffs, drugs, chemicals, pigments,
paints . . . whatever the substance,
optical instruments will analyse it in minutes
where the chemist takes hours.

They guarantee the purity of your product,
save you costly time and labour.

The illustration shows the H 800 double-beam infrared spectrophotometer, the latest of a long line of commercial infra-red instruments dating back to 1913.

HILGER & WATTS LTD

98 ST PANCRAS WAY, LONDON, NWI



For 25 years now we have been providing the answers to the filtration problems of the Chemical and allied industries. That is why in the Metafilter you have not only the most advanced but also the simplest system yet devised, producing optically clear filtrates at low working costs, without the need of cloths, or filter mats. Furthermore, the Metafilter is easily cleaned and sterilised. The Metafilter can be supplied in a range from 1 gallon to 10,000 gallons per hour in



all metals — mild steel, copper, bronze, monel metal, aluminium and stainless steel — for temperatures up to 300°C. If you have a filtration problem, let us know about it — we probably have the answer to it.

One of six Metafilters in stainless steel supplied to Messrs. I.C.I. Ltd. in connection wi't Nylon production.

Metafilter

PURITY WITH SIMPLICITY

THE METAFILTRATION CO. LTD. BELGRAVE RD., HOUNSLOW, MIDDX.

Telephone: HOUnslow 1121-3





CALCIUM THIOGLYCOLLATE

- The essential chemical for depilatory purposes
- Available in quantity for immediate delivery
- Write for our technical brochure
 "THIOGLYCOLLATES IN THE COSMETIC INDUSTRY"

ROBINSON BROTHERS LTD.

ROBINSON BROTHERS LIMITED, RYDERS GREEN. WEST BROMWICH. Tel: West Bromwich 2451-3

Manufacturing Chemist-March, 1958

A87

Specialist
Contractors in
Chemical
Brickwork



and manufacturers of acid and alkali resisting cements

F. HAWORTH (A.R.C.) LTD.

ANCS

HEAD OFFICE AND WORKS:

IRWELL CHEMICAL WORKS · RAMSBOTTOM · MANCHESTER

Phones: Ramsbottom 2067, 3079.

Grams: "Cements" Ramsbottom.

40 BUCKINGHAM PALACE ROAD · LONDON · S.W.1
Phone: TATE Gallery 3861.

Grams: "Chembrik Sowest" London.

ACID MONOCHLORACETIC

Free of DI- and TRI-CHLORACETIC ACID
PECHINEY MANUFACTURE

ETHYLENE GLYCOL ETHERS
ETHANOLAMINES

NAPHTACHIMIE MANUFACTURE

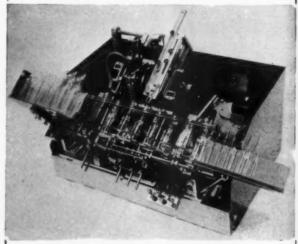


KINGSWAY LONDON W.C.2 T.A. CHLORATE TN COVENT GARDEN 2944 (4 UNES)

MANNING

for: AMPOULE AND TUBE

Washing, Filling and Sealing Machines



Illustrated above Model 21. Fill and Draw-Seal.

Manufacturers and Suppliers:

A. J. MANNING LTD.

28 MOUNT PLEASANT, WEMBLEY, MIDDX.

Phone: WEMbley 5272

March, 1958-Manufacturing Chemist



F. W. BERK & Co., Ltd.

Welcome you at their NEW HEAD OFFICE



BERK HOUSE, PORTMAN SQUARE, LONDON, W.1

HUNTER 6688 (22 lines) BERK, LONDON, TELEX

MANCHESTER

GLASGOW

BELFAST

SWANSEA

Manufacturing Chemist-March, 1958

A89

CECA

ACTIVATED CARBONS

FOR EVERY APPLICATION

INFORMATION AND QUOTATIONS ON REQUEST

THE BRITISH CECA COMPANY LTD

175 PICCADILLY, LONDON, W.I

Tel.: HYDE PARK 5131-5 Cables: ACTICARBON, LONDON



PULVERISING MILLS



- Four sizes available
- Finest powder one throughput

Further details sent on request.

Test mill available



NOW MANUFACTURED AND SOLD BY

FOLLSAIN-WYCLIFFE FOUNDRIES LTD

LUTTERWORTH : Nr. RUGBY . Tel.: Lutterworth 10, 60 & 152

ARE YOUR BOTTLE CLOSURES REALLY GOOD? OR ARE YOU STILL GETTING SPOILAGE AND RETURNS THROUGH LEAKERS!!!

The sovereign remedy is to specify "Rocdaw Liners" when you order metal or plastic caps from your supplier.

Rocdaw Liners are a bonded layer combination of wood pulp, compo cork and facing required according to product.

The advantages of Rocdaw Liners are:

- (A) Perfect fit in your caps and no risk of dropping out through shrinkage.
- (B) Offers the resiliency of compo cork but spread controlled by the wood pulp and the sealing surface components, ensuring even and leakproof sealing impressions.
- (C) Rocdaw Liner makes the best seal and re-seal.
- (D) All sizes available in British Standard R3 and R4 specifications for metal and plastic caps.

Write for further particulars and samples to:

SUTALITE LIMITED

Department "L", 12 GREAT PORTLAND STREET LONDON, W.I Telephone: Museum 7263

OXYHYDROLISERS

For the Production of Pure Hydrogen & Oxygen



Enquiries welcomed

Turbo-Stirrers and Colloid Mills



Phone: FRO. 3174 & 3175 Grame: MORICHEMIC, LONDON

A



MANUFACTURE

HYDRAZINE HYDRATE 80% & 100% Concentrations

HYDRAZINE MONO-SULPHATE 99/100%

THIONYL CHLORIDE double distilled Minimum 99% SOCI2

Write Dept. H/6 for full technical details

51 SOUTH KING ST., MANCHESTER 2. Tel. Deansgate 6077/9 NEWHALL ST., BIRMINGHAM 3.

MAGNESITE

Calcined, Raw, Ground and Unground

MAGNESIUM CHLORIDE

POTASSIUM CARBONATE

SODIUM HYPOSULPHITE (all Grades)

TRIETHANOLAMINE

CITRIC ACID B.P.

TARTARIC ACID B.P.

We can offer Heavy Chemicals for all types of Industry

TENNANTS

(LANCASHIRE) LIMITED

Hazelbottom Road, CHEETHAM

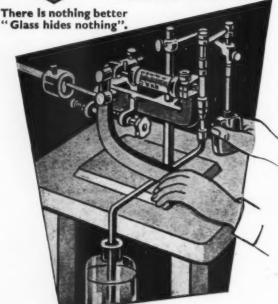
Manchester, 8.

Tel: COLLYHURST 4454/5/6/7

NOVELTY



Filling machine Type I "THROUGH GLASS ONLY"



RUDOLPH W. FRITSCH

Apparatus and instruments for the chemical, pharmaceutical and cosmetics industry.

Richard Wagnerstr. 42 (parli), BAYREUTH, Germany.

L. A. HORNER & SONS LTD.

for

GUM AMMONIACUM
GUM ARABIC
GUM ASSAFETIDA
GUM BENZOIN
GUM ELEMI
GUM GALBANUM
GUM KARAYA
GUM MASTIC
GUM MYRRH
GUM OLIBANUM
GUM OPOPONAX
GUM TRAGACANTH, etc.
Whole and Powdered

All packing done in our warehouse at

> Model to 14" Roller

47-49, THE HIGHWAY, E. 1



66 BEATALL 99 LABEL GUMMING MACHINES

Ideal for short runs.
Saves time and adhesive.

FARROW & JACKSON LTD.

(Associated with Purdy Machinery Co. Ltd.)
41-42 PRESCOT STREET, LONDON, E.I

Established 1798

March, 1958-Manufacturing Chemist

"A thing of beauty



is a joy for ever"



TD.

"But beauty faded has no second spring"

"Absence makes the heart



grow fonder"

"Out of sight



out of mind"

"Too many cooks spoil the broth"



"Many hands



make light work"

Competitive quotations on request

—for Adrenaline, Atropine, Benzamine Salts, Bismuth Salts, Carbachol, Cinchophen, Emetine and E.B.I., Ephedrine, Ergometrine, Homatropine, Hyoscine, Hyoscyamine, Ouabain, Physostigmine, Pilocarpine, Quinine, Strophanthin-K, Sulphaguanidine, and many other alkaloids and glycosides.

B.W. & CO. FINE CHEMICALS



nist

BURROUGHS WELLCOME & CO. (The Wellcome Foundation Ltd.) LONDON



POWDER SIFTING & MIXING MACHINES

The sturdily built mixing machines have specially designed arms to ensure absolute uniformity of mix throughout. Capacities: 75 lbs. to ½ ton. The sifting and mixing machine blends, sifts and then mixes. Preliminary blending ensures complete distribution of ingredients before sifting. Capacities: 75 lbs. to 500 lbs.

ELEVATORS & SCREW CONVEYORS

The Alite range of elevators and screw conveyors when used with the Powder Handling Equipment enables complete plants to be installed—details of these together with continuous metering and mixing units, available on request.

Leaflets No. 8 & 4



LETCHWORTH 965/6

MACHINES LIMITED

PIXMORE AVENUE LETCHWORTH HERTS

JACW/MC/4

TURPENTINE & ROSIN DIPENTENE PINE OIL & SPIRIT BIRCH TAR OIL PINE TAR & TAR OIL TALL OIL

Enquiries solicited

★ ESTD. THE WHITE SEA & BALTIC CO.
P. & I. DANISCHEWSKY LTD.

4 BROAD STREET PLACE, LONDON, E.C.2

CHEMICAL

in

COPPER, ALUMINIUM & STAINLESS STEEL

Prices to Individual Specifications.

J. A. WELCH

(PLANT & VESSEL) LTD.

STALCO WORKS

LIVINGSTONE ROAD, LONDON, E.15

Telephone: MARyland 5818-3 Lines

AUTOMATIC NUMBERING MACHINES

for quick and accurate marking of packing cases and cartons. Machines, as illustrated, supplied with rubber faced letters and figures give excellent results on wood or cardboard.

We manufacture all types of rubber stamps for office and factory use and have specialized in their production for over 70 years.



123



Our hand-stamps are particularly well made with highly polished Perspex mounts of a special design.

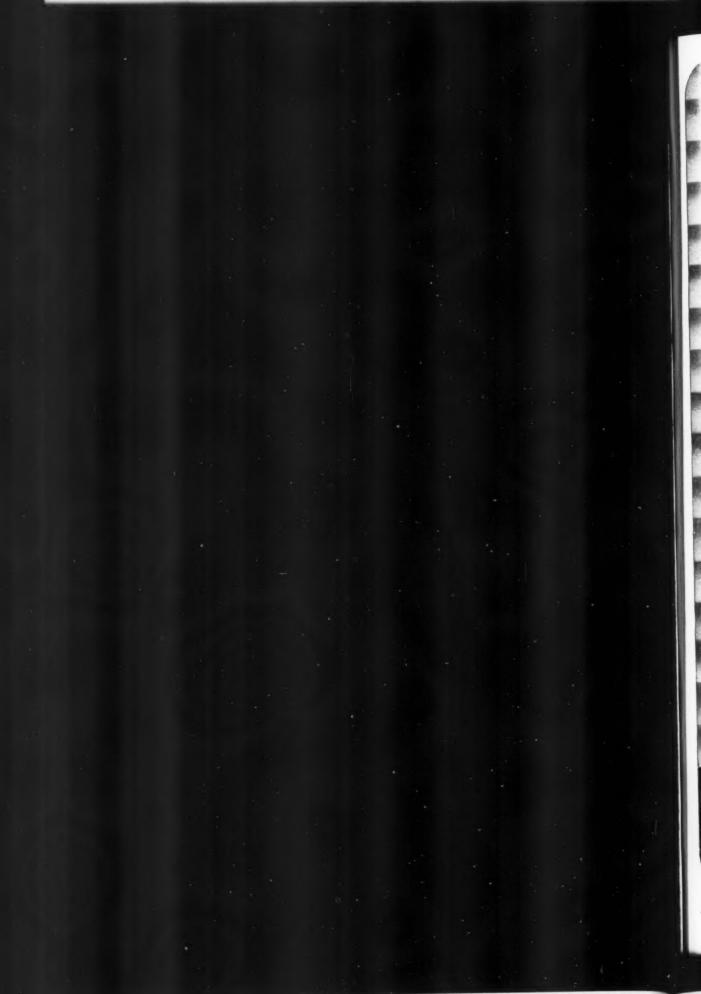
These are very attractive, so much easier to pick up the right stamp when in a hurry.

Write for lists and information

E. M. RICHFORD LTD

8-9 SNOW HILL LONDON E.C.I Tel. Cen 9241-2







Raw Materials for the Chemical Industry

OLEINES

Pale - Low Cold Test Grades

STEARINES

Triple & Double Pressed -Block, Powdered & Flake -

DISTILLED FATTY ACIDS

From Vegetable Oils & Tallow

GLYCERINES

B.P. & Industrial

WHITE SOAPMAKING OLEINES & FATTY ACIDS

Blended to Customers' Requirements

"UNIVOL" PURE ACIDS-BY FRACTIONAL DISTILLATION

> U.314 90% Lauric Acid-U.312 Capryllic/Capric Acids

The UNIVERSAL OIL Co. Ltd.

LONDON

Head Office and Works

HULL

Phone: 15191 (8 lines)

LEEDS

Cunard House, 88 Leadenhall Street, E.C.3. 'Phone: AVE. 4081 (3 lines)

Telegrams and Cables: "UNIVOL, HULL' Telegrams: "UNOIL, LEEDS."

7 East Parade, Phone: 24505.

SELECTOCHIMICA-LAUTENBERG S.A.
LOCARNO-SWITZERLAND
for FINE PHARMACEUTICALS



PEARCE for POTASH

POTASH CARBONATE
POTASH CAUSTIC
POTASH FERRICYANIDE
POTASH NITRATE
POTASH CHLORATE
POTASH SULPHATE
POTASH CHLORIDE
POTASH BICARBONATE
POTASH METABISULPHITE
POTASH FERROCYANIDE
PETROLEUM JELLY

L. R. B. PEARCE, LTD.

3 BUCKLERSBURY, LONDON, E.C.4

CITY 4243

ELLARBEPEA, LONDON

H. W.

GRAESSER-THOMAS

LIMITED

49 LEADENHALL STREET, LONDON, E.C.3

Telephones: ROYAL 3011, 6111

Cables: UNOMEE, LONDON

ASPIRIN

"FRE-FLO" · POWDER · CRYSTALS

___ and ____

SACCHARIN
SODIUM SALICYLATE
SALICYLIC ACID
METHYL SALICYLATE
GLYCOL-MONO-SALICYLATE
SALOL
VANILLIN

We look forward to having your enquiries for these and other Chemicals.

MOHAWK BRAND

"CHIEF" OF PEPPERMINT OILS



SINGLE DISTILLED MOHAWK
USP RE-DISTILLED MOHAWK
USP TRIPLE DISTILLED MOHAWK

SUPERIOR ON ALL COUNTS

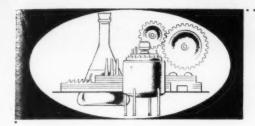
QUALITY - UNIFORMITY - FLAVOUR



Sole Agents in U.K.: JACOBSON VAN DEN BERG & CO (UK) LTD. 3/5 CRUTCHED FRIARS, EC3

Telephone ROYal 7664/8

March, 1958-Manufacturing Chemist



HYDRIDES

a key factor in many new processes

Complete technical information concerning the hydrides listed below is available to you, without obligation.

CHEMICAL HYDRIDES

Lithium Aluminium Hydride—Reducing agent for organic acids, esters, ketones, aldehydes and acid chlorides.

Sodium Borohydride—Reducing agent aldehydes, ketones, acids, acid anhydrides and other functional groups.

Potassium Borohydride—Reducing agent for carbonyl groups of aldehydes, ketones, acid halides and esters.

Sodium Hydride—Condensing agent for Claisen, Dieckmann,

Stobbe, nitrile and acetoacetic condensations. Reduction of metal halides to metal.

Calcium Hydride—Reducing agent for inorganic oxides, drying agent, source of hydrogen.

Methyl Borate—Non-aqueous liquid, neutron shield; starting material for boron chemicals.

METAL HYDRIDES

Titanium Hydride — Brazing agent in ceramic-ceramic and ceramic-metal seals. In copper and nickel alloys, yields agehardening properties.

Zirconium Hydride—Electronic getter, alloying agent in powder metallurgy, ingredient in pyrotechnic composition.

Titanium and Zirconium Alloys—As both master alloy and as powder are used in magnetic materials and high temperature alloys.

Thorium—Electronic and atomic energy application.

Chromium-Nickel Alloy Powder—In powder metallurgy, as additive to iron powder parts for high strength properties.

manufactured by Metal Hydrides Incorporated, Beverly, Massachusetts, U.S.A.

Represented by: London & Scandinavian Metallurgical Co. Ltd., 39-41 Hill Road, Wimbiedon, London, S.W.18, England.
A. B. Supplator, Box 16158, Stockholm 16, Sweden.

Metalchimica, S.P.A., Via Stampatori 21, Torino, Italy



GLASS ENAMEL LINED EQUIPMENT

A Complete Plant or a Single Unit.

Designed to meet your own requirements, and lined with a Hard Glass

Enamel developed during over a century of service to the chemical industry.



T. & C. CLARK & C. LT.

WOLVERHAMPTON

Established 1793

Grams: Clark, Wolverhampton Telephone 20204/5

D.

st

p-NITRO BENZOYL CHLORIDE

METHYL ACETANILIDE

CALCIUM SALICYLATE

p-ACETAMIDOPHENOL

HYDROBROMIC ACID

BROMBENZENE

CARBROMAL B.P.C.

BROMVALETONE B.P.C.

MONO BROMACETIC ACID

MANUFACTURED BY

CHEMICAL COMPOUNDS

LIMITED

AYCLIFFE TRADING ESTATE

Telephone: Aycliffe 3230



Two essential books for the Cosmetician

TECHNIQUE OF BEAUTY PRODUCTS

by R. M. Gattefossé

Cosmetology, or the science of cosmetics, has abandoned the empirical way followed from time immemorial. Today we are sufficiently acquainted with the nature of the epidermal tissues and with their possible reactions to external agents to be able to indicate the proper way to treat them so as to achieve the bloom of youth. It is not solely the question of masking a blemish or of a make-up giving the illusion of reality. It is the achievement of a methodical, careful hygiene which restores the health and suppleness of the skin, and through these its

physiological equilibrium.

This book is not a formulary; it concerns above all the ameliorative products which all can obtain, and also the products to be used in treatments carried out in beauty institutes.

Demy 8vo xi+178 pages Illustrated 17s. 6d. net Postage 1s. 6d. Home 2s. 1d. Abroad

THE PRACTICE OF MODERN PERFUMERY

by Dr. Paul Jellinek

This book is not a collection of perfume formulae, nor is it another encyclopedia of the raw materials for perfume compounding. It is rather a record of the life-long practical experience of the author who belongs to the top rank of European perfumers. To the young chemist wishing to take up perfumery as his career this book offers a method of studying. To the experienced perfumer it offers a help in arranging systematically his accumulated knowledge so as to have it at his finger tips when required.

the book is divided into four parts. I deals with the technique of smelling, study of perfumery materials, technique of compounding, the matching of perfumes, etc. II discusses perfumery of cosmetics and includes valuable tables showing the suitability of individual aromatics for the different kinds of cosmetic products. III deals with the perfumery of soaps, and again data on the behaviour of individual aromatics in the soap are presented in extensive tables. IV is concerned with the psychological aspects of perfumery.

Demy 8vo x+219 pages 25s. net Postage 1s. 6d. Home 2s. 1d. Abroad

Obtainable through your usual bookseller

LEONARD HILL [BOOKS] LIMITED, EDEN STREET, LONDON, N.W.1

M



There once was a man named Horatio Flynn
Who phoned us and sighed "What a mess I am in!
I require a degreaser to clean metal parts
But alas—I've no skill in these chemical arts".
Well naturally, hearing this heart-rending cry
Our first thought, whilst wiping a tear from our eye
Was to send out a rep with instructions quite plain
"Till you've got all the gen—don't come back again"!



(We're not always so beastly to lads of our choice
But find they respond to a sharp tone of voice)
Thus, in no time at all we helped poor old Flynn
To develop a product with surfactants in
Which would clean off all grease and make each part shine
Like the face of a man with an all-correct line!



One of the many uses for H-A surface active agents is in various types of degreasing formulations. Please don't hesitate to send details of your particular problems.

HONEYWILL & STEIN LIMITED

DEVONSHIRE HOUSE, MAYFAIR PLACE, PICCADILLY, LONDON, W.I

Tel MAYFair 8867

Mitchell

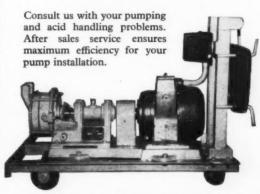
CORROSION-PROOF PUMPS

For Acids and all corrosive liquors and when freedom from metal contamination is required.



CENTRIFUGAL PUMPS
MOTOR DRIVEN DIAPHRAGM PUMPS
ROTARY DISPLACEMENT PUMPS
HAND OPERATED DIAPHRAGM PUMPS





Enquiries also invited for complete bulk storage and distribution plants designed and built for acids, chemicals, etc.

L. A. MITCHELL LTD., 37 PETER ST., MANCHESTER 2

Phone: BLAckfriars 7224 (4 lines)

MP32

A99



AMBYTHENE

(BRAND OF POLYTHENE

STOPPERS & CAPS

SAMPLES OF .

PLUG-IN and SNAP ON

VARIETIES

FROM

AMPLEX APPLIANCES (KENT) LTD.

19, DARTMOUTH ROAD, HAYES, BROMLEY, KENT (RAVensbourne 5531)

FATTY ALCOHOLS C8-C18

FATTY ALCOHOL SULPHATES

LIQUID . PASTE . POWDER . NEEDLES

ALKYL ARYL SULPHONATES

LIQUID · PASTE · POWDER

NON IONIC EMULSIFIERS

FOR WIO AND OW EMULSIONS

SELF EMULSIFYING WAXES B.P.

ANIONIC AND NON-IONIC

OUATERNARY AMMONIUM COMPOUNDS

LAURYL-DIMETHYL-BENZYL-AMMONIUM-BROMIDE CETYL-DIMETHYL-BENZYL-AMMONIUM-BROMIDE

SIPON PRODUCTS LIMITED

Chemical Manufacturers

23 DRYDEN CHAMBERS, I 19 OXFORD ST., LONDON, W.I Telephones: Gerrard 0062, 4268. Cables: SUPROL, LONDON Factory as: MULBERRY WAY, BELYEDERE, KENT Telephone: Erith 5409 Attention Polish Manufacturers!

R WAX No. XY

HIGH GLOSS WAX SUPER HARD

M.P. 97/99 C. Penetration 100g/5"/25° C. 2-4

A new development with superior qualities.

Blended with Paraffin Wax alone, without any natural wax, it gives a Polish Base of best quality at an economical price.

Ask for sample and special leaflet.

RENHAM & ROMLEY LIMITED

10, Canfield Place, London, N.W.6. Tel.: Maida Vale 6220, 6223



Carl Aug. Reinz

GLASHUTTENWERKE SCHLEIDEN (EIFEL)

GERMANY

N



MAGNESIUM TRISILICATE ALUMINIUM GLYCINATE

(DIHYDROXY ALUMINIUM AMINOACETATE)

ALUMINIUM ISOPROPOXIDE TRICHLOROACETIC ACID

Write for samples and prices:

KAYLENE (CHEMICALS) LIMITED

WATERLOO ROAD, LONDON, N.W.2

TELEPHONE: GLADSTONE 1071/2/3

TELEGRAMS: KAYLOIDOL, CRICKLE, LONDON



s.

e.

D

glass etic

EL)

nist

DNERS of Gloucester

You will be in good company when you specify Gardners. Firms whose names are household words employ Gardner mixers, sifters, dryers, and grinders for their processing equipment. There is a Gardner standard machine or a "special" for dealing with liquids, solids, granules, pastes, and powders. Why not consult Gardners about your problem. Send a sample of your material for a confidential test and report. It may save you man-hours and improve your product.

Send for the Gardner list of 22 types of processing plant



BALL AND PEBBLE MILLS For grinding powders, liquids, minerals, etc. Made inseveral types and sizes with single or multiple pots. Lined with hard steel, porcelain, silex, etc.



Wm. GARDNER & SONS (GLOUCESTER) LTD., BRISTOL ROAD, GLOUCESTER (A subsidiary of the Gloucester Railway Carriage & Wagon Co. Ltd.) Tel: Gloucester 21261 Grams & Cables: Gardner, Gloucester London Office: I Albemarle Street, London, W.I. Telephone; Grosvenor 8206

Manufacturing Chemist-March, 1958

AIOI



"An Eye on the Ball"

—is our job. We must know about crop times whether harvests have been successes or failures —about export restrictions and currency fluctuations. Handling, as we do, a multitude of raw materials botanical drugs, gums, spices, essential oils, waxes, etc., there is no relaxation—a constant stream of information that we must seek and collate.

You must keep your eye on us



BROME & SCHIMMER LTD.
7 Leather Market, London, S.E.I



CHILEAN IODINE

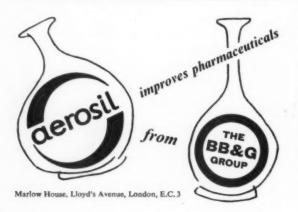
(Guaranteed 99% Purity)

Obtainable for Prompt Delivery from

ANTONY GIBBS & SONS LTD.

22, BISHOPSGATE, LONDON, E.C.2.

(Sole European Agents)
Telephone: LONdon Wall 4111



CAMPHOR

(Technical and B.P.)

PEPPERMINT OILS
MENTHOL CRYSTALS
STAR ANISEED OIL
FOLIC ACID

McKESSON & ROBBINS LTD

UNIVERSAL HOUSE, SOUTHWARK BRIDGE, LONDON, S.E.I

ANHYDROUS LANOLIN B.P.

CRUDE TURTLE OIL
ESSENTIAL OILS
AND COMPOSITIONS

COUPER, FRIEND & CO.

LIMITED

33/35 Eastcheap, London, E.C.3. Telephone: Mansion House 3166

Telegrams: "Coupmill, Bilgate, London". Cables: "Coupmill, London"

PLASTIC TUBE FILLING REPUBLIC OF IRELAND

We are now fully equipped to carry out contract manufacturing and packing as above. Base heat sealing.

VICTOR E. HANNA LTD. 68/72 LR. MOUNT STREET, DUBLIN



PHARMAZEUTISCHE PRÄPARATE o.H.G.

Mainz 22

Manufacturers of

Germany

ERGOT-ALKALOIDS

Ergotamine – Ergocristine
Bases, Salts and Dihydro Products

Permanently controlled with regard to purity by the Pharmaceutical Institute of the University Mainz

PRIVATE & CONFIDENTIAL

APART FROM OUR STOCK PRODUCTION LINES OF NICOTINATES, VITAMIN "K" ANALOGUES, CITRATES, 8 HYDROXYQUINOLINE AND ITS DERIVATIVES, ETC. WE MANUFACTURE A NUMBER OF SPECIAL LINES FOR INDIVIDUAL CUSTOMERS, WHICH WE DO NOT OFFER ON THE OPEN MARKET.

If you want a speciality made, why not write in confidence to

R.F.REED LTD

HERTFORD ROAD . BARKING . ESSEX

Telephone: Rippleway 2224

Telegrams: Kemiscale Barking

RADE

MARK

FINE CHEMICALS manufactured to the HIGHEST STANDARDS



KESTNER EVAPORATOR & ENGINEERING CO. LTD., 5 Grosvenor Gardens, London, S.W.1

Manufacturing Chemist—March, 1958

mist

A103

special items you may require.

SULPHONATED CASTOR-OIL TURKEY RED OIL CASTOR OIL SOAPS SOLUBLE OILS, ETC.

Textile and technical qualities.

THE

UNITED INDIGO & CHEMICAL CO.

HEAD OFFICE: MANCHESTER 4 Telephone: BLAckfriars 7125/6/7

METABISULPHITE OF POTASH EFFECTIVE PRESERVATION FOR ALL KINDS OF FOODS AND DRINKS MAXIMUM SO2 CONTENT

GRADED CRYSTALS, POWDER AND TABLET FORM

Write for samples, prices and analysis to:

F. KENDALL & SON LTD.

Stratford-on-Avon

Tel: Stratford-on-Avon 2031

CHEMICALS AND FEEDS LIMITED

ADELAIDE HOUSE, KING WILLIAM STREET, LONDON, E.C.4 Tel.: Mansian House 9621 (3 lines) Cables: 'Chemifeed' London

MANGANESE DIOXIDE

BRITISH

POTASSIUM CARBONATE

Associated with: P. Leiner & Sons, Ltd., Treforest Chemical Co. Ltd., Glamorgan Alkali & Acid Co. Ltd., Miskin Lime Co. Ltd., and other U.K. and Overseas manufacturers.

PURISS

For Pharmaceutical and Cosmetic Use

H. LATTIMER

22 Upper Ground, Blackfriars Bridge, S.E.1

Tel.: Waterloo 5800 Grams: Glebeless, Sedist, Lond. Cables: Glebeless Lond.

COLOURS for Pharmaceutical,

Cosmetic and Industrial Purposes

W. S. SIMPSON & CO. (THE BRITISH ANILINE DYE AND CHEMICAL WORKS), LIMITED 1-23 Linden Way, Old Southgate, N.14. Tel.: PALmers Green 0196

DI CHLOR META XYLENOL PARA CHLOR META XYLENOL

- LIQUOR CHLOROXYLENOLIS (B.P.)
- CHLORINATED XYLENOLS
- CARBONATE OF POTASH (All Grades)
- CAUSTIC POTASH (All Grades)
- MODOCOLL (Cellulose Ether) TRIETHANOLAMINE
- POLYETHYLENE GLYCOLS

CHAS. PAGE & CO. LTD.

52, GROSVENOR GARDENS, LONDON, S.W.I

Telegrams: Inland: "Paganini, Sowest, London" Foreign: "Paganini, London"

else et Sale, Manchester & 41 St. Vincent Place, Glasgow

SHELLAC, GUMS, RESINS, etc. as imported or ground or pulverised to all standard and special requirements

Write or telephone for samples to:

WOODHAMS, DADE & CO.

36, GRACECHURCH STREET, LONDON, E.C.1

Phone: MANSION HOUSE 0055-6-7

Grams: "WOODADE, LONDON" Telex: 22655.

glass blowers, quartz burners for medical and technical purposes, quartz laboratory appliances.

We specialize, for over 30 years, in quartz glass mercury diffusion pumps. QUARZSCHMELZE ERICH KIESSLING Bad Harzburg-Radautal, Germany

SUPER RECTIFIED TERPINOLENE

FATOILS LTD. LONDON E.C. 2.

Telephone: London Wall 5047/9



PLANETARY STIRRING APPARATUS

Planetary stirring apparatus, 7-120 litres. The only machine in the world with adjustable planet guide and a counter-rotating basin scraper. Performance and operating method are unequalled. Great engine power, smooth control.

F. HERBST & CO., NEUSS/Rh.15 Bergheimer Str. 31, Germany Achemor, Frankfurt, 31.5 - 8.6, Halle 3, Stand \$25

All Pharmaceutical Machinery and Equipment

-also for small-scale production and laboratory purposes.

IOSEF DECKELMANN, Aschaffenburg, (West Germany)

March, 1958-Manufacturing Chemist

N

CLASSIFIED ADVERTISEMENTS

Rates: 4 |- per line,
Minimum 12 |-, Box No. 1|45 |- per single column inch.
Classified Advertisements must be
prepaid. Wording should be sent, with
remittance, to:
CLASSUPPER CLASSIFIED ADVERT. DEPT.

Manufacturing Chemist
LEONARD HILL HOUSE
EDEN STREET, LONDON, N.W. 1

SITUATIONS VACANT

etc. l to

ents

O.

C.3

655.

S

ıl

u

S d d

5

nist

REPRESENTATIVE. A large firm of chemical manufacturers have a vacancy for a Representative in Lancashire and the Western Counties to promote sales of aromatic compounds and chemicals. Some chemical background is desirable but previous experience in the perfumery industry, although an asset, is not essential provided applicant is keenly interested in this special field. Residence within easy reach of Lancashire is essential. There is a Pension Fund and Life Assurance Scheme in operation.—Apply initially in writing to Box 3827B, Manufacturing Chemist, Leonard Hill House, 9 Eden Street, London, N.W.I. REPRESENTATIVE. A large firm of chemical

N.W.1.

VITAMINS LTD. require a young Organic Chemist to undertake Physico/Chemical investigations in connection with the formulation and stability of vitamin products. Applicants must possess a good honours degree or equivalent and have completed their national service. Some industrial experience in the production and/or development of organic fine chemicals would be anadvantage. This post, which will be based on Vitamins Ltd. factory in Crawley New Town, where housing will be available, presents an excellent opportunity for a practical-minded person able to work on his own initiative. Salary according to age and experience. Five-day week, canteen, social club facilities. Contributory superannuation scheme.—Apply Personnel Officer, Vitamins Ltd., Manor Royal, Crawley, Sussex.

VITAMINS LTD. require an Organic Chemist, aged 27/35, to take charge of their Chemical Process Development Section. Applicants must possess a good honours degree or equivamust possess a good honours degree or equivalent, and have about three years sound general experience in the development and operation of processes for the production of pharmaceutical fine chemicals and related intermediates. This post, which will be at Vitamins Ltd. factory in Crawley New Town, where housing will be available, calls for a person possessing drive and initiative, well able to organise his own section's activities and also co-operate with the Company's Chemical Research and Bulk Production Sections, and offers excellent prospects in an expanding enterprise. Salary will be according to age and experience but not less than £1,000 per annum. Five-day week, canteen, social club facilities. Contributory superannuation scheme.—Apply Personnel Officer, Vitamins Ltd., Manor Royal, Crawley, Sussex.

PORTUGUESE pharmaceutical house requires for service in Portugal a Biochemist experienced in industrial production. Age not over 45, preferably single, knowledge of French an advantage.—Apply with fullest details of qualifications and experience and photograph to Box 3828B, Manufacturing Chemist, Leonard Hill House, 9 Eden Street, London, N.W.I.

CHIEF Chemist required to undertake developchief Chemist required to undertake develop-ment of new factory to manufacture Citiric Acid, etc., by fermentation. Salary com-mensurate with experience. Considerable scope for ambitious person.—Apply giving details of experience to Box 3832B, Manu-facturing Chemist, Leonard Hill House, 9, Eden Street, London, N.W.I. SITUATIONS VACANT

LABORATORY TECHNICIANS

LABORATORY TECHNICIANS
PHIZER LTD.

invites applications from technicians
with laboratory experience for interesting
positions in their Biologicals Unit.
Whilst experience of biological, bacteriological, micro-biological and virological
work would be of considerable advantage,
it is not essential.
The Company offers generous starting
salaries; and a non-contributory Pension
and Life Assurance Scheme. Removal
expenses will be paid on taking up
appointment.

appointment.

The Unit is situated at Richborough, Sandwich, a pleasant non-industrial area of East Kent.

Applications should be made in writing, giving full details of age, experience, etc.,

Personnel Officer, 137/139, Sandgate Road, FOLKESTONE. Quoting Reference: E.6633.

CHEMIST

J. GODDARD & SONS LTD. manufacturers of domestic and industrial polishes, Nelson St., Leicester, require chemist with university degree to supervise development work and quality control. Applicants should be 28 to 36 and have industrial experience.

This position offers good prospects and the working conditions are excellent. A superannuation scheme is in operation.

Application with full details of education and experience to above

PUBLIC APPOINTMENTS

THE UNIVERSITY OF LEEDS
Applications are invited for Imperial Chemical Industries Limited Research Fellowships in Bacteriology, Biochemistry, Biomolecular Structure, Botany (Plant Biochemistry and Biophysics), Chemical Engineering, Chemistry, Chemistry of Leather Manufacture, Chemostry, Colour Chemistry and Dyeing, Engineering (Civil, Electrical or Mechanical), Fuel and Refractories, Geology (including Geochemistry), Metallurgy, Mining (Selective Flotation and Geophysical Surveying), Pharmacology, Physics, Physiology or Textile Industries (Chemistry of High Polymers (Keratin and man-made fibres), Textile Technology and Textile Engineering). The Fellowships will be of an annual value within the range £700-£1,000 a year according to qualifications and experience and will normally be tenable for three years. Further particulars can be obtained on request.—Three copies of applications (one in the case of applicants from overseas), together with the names of two referees, should reach the Registrar, The University, Leeds, 2, not later than April 12, 1958.

MACHINERY AND PLANT FOR SALE

SILICONE Rubber Bungs, tubing, sheet, bottle cap liners, washers and mouldings made to specification.—Esco (Rubber) Ltd., 34/36, Somerford Grove, London, N.16.

MANUFACTURERS of section water storage tanks, 50 to 40,000 gallons capacity. Sewage and Effluent Pumps.—G. L. Murphy Limited, Imperial Works, Menston, Nr. Leeds.

MIXERS and Blenders. Usually a varied selection available for quick delivery. Enquiries welcome.—Winkworth Machinery Ltd., 65, High Street, Staines.

MACHINERY AND PLANT FOR SALE

TWO Alfa-Laval Oil Purifiers, type 1400, capacity 66/80 gallons of oil per hour. One purchased in 1930 and one purchased in 1950. Both Machines are in perfect working condition. First reasonable offer accepted.—Fullest details will be supplied on request to Box 3830B, Manufacturing Chemist, Leonard Hill House, 9, Eden Street, London, N.W.1.

ONE Titan N.S.70 Superjector Continuously Discharging Oil Separator. This Machine was purchased in 1950 and is in excellent condition being in operation up until the present date. First reasonable offer accepted.— Fullest details will be supplied on request to Box 3829B, Manufacturing Chemist, Leonard Hill House, 9, Eden Street, London, N.W.I.

SECOND-HAND PLANT FOR SALE

ECONOMIC BOILERS
Three Edwin Danks Treble Pass, 10 ft. 6 in.
diam. by 11 ft. 6 in. by 16 ft. 6 in., evap.
11,620 lb./hr., 200 p.s.i., complete with Hopkinson stoker.
Three John Thompson Treble Pass, 9 ft. 6 in.

diam. by 14 ft. by 19 ft., evap. 9,900 lb./hr., 120 p.s.i., complete with oil firing equipment and usual mountings. Five Marshall Treble Pass, 8 ft. diam. by 9 ft. 6 in. by 12 ft., evap. 4,250/5,200 lb./hr., 100

p.s.i.
Oil firing equipment can be supplied if neces-

GEORGE COHEN SONS & CO. LTD.

WOOD LANE, LONDON

W.12

Tel.: Shepherds Bush 2070

& STANNINGLEY Nr. LEEDS

Tel.: Pudsey 2241

AUTOREX Precision Bottle Labelling AUTOREX Precision Bottle Labelling Machine. Gravfil 2-head stainless steel Vacuum FillingMachine Two 40-gal. capacity Keebush Mixing and Storing Tanks. All in perfect condition throughout and little used since new.—Apply Box 3833B, Manufacturing Chemist, Leonard Hill House, 9, Eden Street, London, N.W.I.

KILLIAN Model DPID 41-punch Rotary Tableting Machine with double hopper feed, capacity up to 60,000 per hour. New 1957 and in excellent condition.—Apply Box 3834B, Manufacturing Chemist, Leonard Hill House, 9, Eden Street, London, N.W.1.

MISCELLANEOUS SALES

REDUCTION Geared Motor, any size or speed or voltage, available from stock.—Universal Electrical Co., 221, City Road, London, E.C.r.

TIME Recorder Rentals Ltd., 157-159, Borough High Street, London, S.E.I. Tel.: HOP 2230.

MINIATURE Dictating Machine: Minifon P.55 "S" had little use. Leather case for travelling.—Offers to Box 3835B, Manufacturing Chemist, Leonard Hill House, 9, Eden Street, London, N.W.I.

PULVERISING, CRUSHING

MANGANESE, Graphite, Charcoal, Soldering Fluid, Bituminous Compounds. Pulverising, crushing, grinding.—Thomas Hill-Jones Ltd., Invicta Works, Bow Common Lane, London, E.3. Tel.: East 3285.

PULVERISING, Grinding, Mixing, Drying. We collect and deliver.—Crack Pulverising Mills Ltd., Plantation House, Mincing Lane, London, E.C.3. Tel.: MANsion House 4406.

BUSINESS OPPORTUNITIES

ANALYTICAL & CONSULTING CHEMISTS

Established and expanding firm of Analytical and Consulting Chemists, offer services and facilities for all types of Analyses, Technical Investigations, Research and Development programmes etc., in fully equipped modern laboratories staffed by qualified personnel.

In addition to the United Kingdom, overseas enquiries are invited, all communications being treated in strictest confidence.

NEWCHEM LIMITED, POYNTON, CHESHIRE

OUR Factory at Your Disposal. We have modern facilities for the production, under your own Brand, of preparations like bath cubes, bath salts, powder in envelopes, perfumes, talcum powder, etc., as well as technical products, e.g.; disinfectant blocks, moth repellants and agricultural tablets.—Write Box AC. 36697, Samson Clarks, 57/61, Mortimer Street, W.I.

HAVE you a Chemical Mixing Problem? Established Company of Manufacturing Chemists specialising in Compounding invite enquiries.—Alfred White and Sons Ltd., 718/720, Old Ford Road, London, E.3. Tel.: ADVance 5671.

BUSINESS OPPORTUNITIES

MAILINGP 15,777 Retail Chemists. Addressing, enclosing and despatching literature.— I.M.S., 81, Blackfriars Road, London, S.E.I.

INTERNATIONALLY known firm of perfumery and cosmetics seek efficient and well introduced agent for active distribution of their products in the United Kingdom.—Box 3831B, Manufacturing Chemist, Leonard Hill House, 9, Eden Street, London, N.W.I.

AUSTRALIAN CHEMICAL COMPANY

The Chairman of Directors of an Australian Public Company with Pharmaceutical and Industrial Chemical formulation subsidiary companies will be a resident in Great Britain during March and May, 1958.

He will be pleased to make contact with English and European companies who wish to extend their sphere of operations into Australia and nearby countries.

We are interested in the following:

1. To acquire additional manufacturing contracts for our Australian plant.

 To establish conjoint manufacturing subsidiary companies in Australia for the purpose of locally manufacturing the above classes of product.

We are not interested in the purchase of merchandise for resale in Australia.

Apply to Box 3818B.

Manufacturing Chemist LEONARD HILL HOUSE, 9 EDEN STREET, LONDON, N.W.I.

CHEMIST with offices, storage facilities and sales organisation. Can accept further proposals for General Chemicals; and Pharmaceuticals for the north-western area. — Box 3836B, Manufacturing Chemist, Leonard House, 9, Eden Street, London, N.W.I.

BUSINESS OPPORTUNITIES

WELL-ESTABLISHED Company with worksin Lancashire seeks agencies with manufactures wishing to develop sales of auxiliaries used in Textile and Allied Industries.—Box 38378. Manufacturing Chemist, Leonard Hill House, 9, Eden Street, London, N.W.I.

AGENT required to promote sales of proven Textile Auxiliaries in Scotland.—Box 3838B, Manufacturing Chemist, Leonard Hill House, 9. Eden Street, London, N.W.r.

WANTED

WANTED second-hand Tableting Machine in good condition to make 2-oz. tablets, 2½ in, diam., ½ in. thick. Manesty 3A or 35T pre-ferred, otherwise Killian or Wilkinson.—Reply to James Laing, Son and Co. (M/C) Ltd., Ashburton Road, Trafford Park, Manchester, 17.

CAPACITY AVAILABLE

MANUFACTURER IN DUBLIN

offers facilities for manufacturing and packing many types of pharmaceutical, toilet and industrial preparations, including AEROSOLS. Distribution, with or without representation, also undertaken. Agencies sought, particularly with production. Box 38268. Manufacturing Chemist, Leonard Hill House, 9, Eden Street, London, N.W.1.

FOR SALE

FOR Sale: China Clay, finest English Ceramic/ Refractory/etc.; Powder; Special price: 145s. per ton f.o.r.—Henshaw and Co., 97. Clearmount Road, Weymouth. Tel.: 448.

POTASH, -K20, 4.4% content; very large quantities English material, insoluble, in fine granular or powder; Potash easily extracted; very low price.—Details, write Henshaw and Co., 97, Clearmount Road, Weymouth.

WHEN REPLYING TO CLASSIFIED ADVERTISEMENTS PLEASE MENTION "MANUFACTURING CHEMIST"

To be published shortly

METHODS OF ANALYTICAL HISTOLOGY AND HISTO-CHEMISTRY

Edward Gurr, F.R.I.C., F.R.M.S., F.L.S., M.I.BIOL.

Royal 8vo.

First edition.

Approx. 448 pages.

Approx. 70s. net

M

This book is concerned almost exclusively with the identification, by colour reactons, of chemical groups and compounds, observable under a microscope, in sites they occupy in normal and pathological tissues. It will prove to be of service to a wide variety of workers in histological, pathological, and general biological laboratories.

Also by Edward Gurr

A PRACTICAL MANUAL OF MEDICAL AND BIOLOGICAL STAINING TECHNIQUES

Demy 8vo. Second edition. xxv+451 pages. 42s. net. Postage 1s. 9d. Home, 2s. 9d. Abroad.

LEONARD HILL [BOOKS] LIMITED, EDEN ST., LONDON, N.W.1.

An eye for beauty

What the eye sees, the heart can rejoice over. Glass containers, moulded in distinctive forms, enhance the attractions, while preserving the qualities, of the colourful goods they hold.

Glass, in fact, is the key to successful selling.

Key Glass represents the best in modern glass-making.

A design service is available to meet your particular packaging problem, including closures.



Key Glassworks Ltd

Factories at New Cross · Alperton · Harlow Sole Selling Agents: Ronald Gale & Co. Ltd.

First Class in GLASS

Please address all correspondence to Ronald Gale and Company Limited · 7 Fursecroft · George Street · London WI Manufacturing Chemist—March, 1958

works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a works in a work in a works in a work
of proven x 3838B, 1 House,

s, 21 in. 35T pre-Reply C) Ltd., achester,

LIN ig many ial prebution, rtaken.

eramic/ price: Co., 97,

y large in fine tracted; enshaw mouth.

ION



Putting ideas into capsules

Before getatin capsutes begin to pour from exploring possibilities in many trades and the R.P. Seherer rotary die machines, someone has had a brilliant idea. That someone may be an Experimental Chemist or a Sales Executive in the service of the manufacturer or -a member of the

industries to discover products that are "naturals" for encapsulation. So, while manufacturers may normally expect to call in R.P. Scherer when an encapsuled product is to be launched, there is every R.P. Scherer Organisation. For R.P. reason why consultation should take place Scherer are "capsule minded"-constantly at a much earlier stage. Even before there

is a product! For discussion may reveal that there is in the Scherer laboratory the very product you were just going to invent! If so-it's yours for the asking.



216/22 BATH ROAD, SLOUGH, BUCKS. PHONE: SLOUGH 21241 CABLES: SCHERSLO, SLOUGH.

to g.